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Before the
Federal Communications Commission
Washington, D.C. **20554**

OCT 7 2002

In the Matter of	)	
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Amendment of Parts 2, 25, and 87 of the Commission's Rules to Implement Decisions from World Radiocommunication Conferences Concerning Frequency Bands Between 28 MHz and 36 GHz and to Otherwise Update the Rules in this Frequency Range	)	ET Docket No. 02-305
	)	
Amendment of Parts 2 and 25 of the Commission's Rules to Allocate Spectrum For Government and Non-Government Use in the Radionavigation-Satellite Service	)	RM-10331

NOTICE OF PROPOSED RULE MAKING

Adopted: September **18,2002** Released: October **7,2002**

Comments Date: **60** days from date of publication in the Federal Register.
Reply Comments Date: 90 days from date of publication in the Federal Register.

By the Commission:

I. INTRODUCTION

1. By this action, we propose to amend Parts 2, 25, and 87 of our Rules in order to implement domestically various allocation decisions from several World Radiocommunication Conferences ("WRCs") concerning the frequency bands between 28 MHz and 36 GHz and to otherwise update our Rules in this frequency range. The following proposals are the most significant to non-Federal Government operations: (1) implementing generic mobile-satellite service ("MSS") allocations in the bands 1525-1559 MHz and 1626.5-1660.5 MHz ("L-band"); (2) allocating the band 1164-1189 MHz to the radionavigation-satellite service ("RNSS); and (3) deleting unused and limited fixed-satellite and broadcasting-satellite allocations from the band 2500-2690 MHz. In addition, at the request of the National Telecommunications and Information Administration ("NTIA"), we propose various allocation changes for the space science services' and the inter-satellite service **("ISS),** most of which involve spectrum primarily used by the Federal Government? These proposals would conform our Rules to previous WRC agreements and are expected to provide significant benefits to the American public.

II. EXECUTIVE SUMMARY

2. We propose to provide for generic MSS allocations across the bands 1525-1559 MHz and 1626.5-1660.5 MHz. Specifically, we propose to expand the primary allocation in the bands 1545-1549.5 MHz, 1558.5-1559 MHz, 1646.5-1651 MHz, and 1660-1660.5 MHz from the aeronautical mobile-

[1] ***See ¶ 53, infra,*** for a description of the space science services.

[2] The Commission, which is an independent agency, administers non-Federal Government spectrum and **NTIA,** which is an operating unit of the Department **of** Commerce, administers Federal Government spectrum. **See** 47 C.F.R. § 2.105(a). **NTIA** also approves the spectrum needs of new systems for use by Federal departments and agencies and maintains the Federal Government Table of Frequency Allocations in its ***Manual of Regulations and Procedures for Federal Radio Frequency Management ("NTIA Manual").***

satellite (route) service ("AMS(R)S") to all services within the MSS while preserving the requirements of AMS(R)S. The effect of our proposal is that the bands 1545-1559 MHz and 1646.5-1660.5 MHz would be made available to all types of MSS communications on a primary basis, rather than segmented for specialized use. This action would permit more efficient use of this radio spectrum and would facilitate the expansion of MSS use globally. In addition, because the bands 1530-1544 MHz and 1626.5-1645.5 MHz are currently allocated to the maritime mobile-satellite service ("MMSS") and the MSS on a co-primary basis, we propose to delete superfluous MMSS allocations. We also request comment on whether the secondary allocation for aeronautical telemetry should be deleted from the band 1525-1535 MHz.

3. We propose to allocate the band 1164-1189 MHz to the RNSS for space-to-Earth ("downlink") and space-to-space transmissions in order to accommodate a new civil global positioning system ("GPS") signal.[3] This action would permit the addition of a new **GPS** signal and support the safety-of-life requirements demanded by civil aviation. We also propose to allocate the bands 1215-1240 MHz and 1559-1610 MHz, which are currently limited to RNSS downlinks, for RNSS space-to-space transmissions as well. This action would allow use of spacebome RNSS receivers **for** scientific and commercial applications.

4. We propose to downgrade the primary flight test and radiolocation allocations to secondary status in the band 2320-2345 MHz because the Satellite Digital Audio Radio Service ("Satellite DARS") has been brought into operation. We also propose to delete limited allocations for the fixed-satellite service ("FSS") and the broadcasting-satellite service ("BSS") from the band 2500-2690 MHz in order to remove allocations that are not compatible with two-way, point-to-multipoint fixed uses.

5. We propose to implement domestically various allocation decisions concerning the space science services and the ISS from several WRCs that have not previously been addressed by the Commission. These proposals deal with the following issues:

- Raising secondary allocations for the Earth exploration-satellite service ("EESS")[4] and the space research service ("SRS")[5] to primary status in 1035 megahertz of spectrum in eight frequency bands and to specify that these allocations are to used for active sensor operations ("EESS (active)" and "SRS (active)")? 1215-1240 MHz, 1240-1300 MHz, 5250-5255 MHz, 5255-5350 MHz, 8550-8650 MHz, 9500-9800 MHz, 13.4-13.75 GHz, and 17.2-17.3 GHz. See Table 2, below, for details.

[3] **RNSS** is a radiocommunication service for the purpose of radiodetermination involving the use of one or more space stations. This service may **also** include feeder links necessary for its own operation. Radiodetermination is the determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of radio waves. **See** 47 C.F.R. § 2.1.

[4] EESS **is** a radiocommunication service between earth stations and one or more space stations, which may include links between space stations, in which (1) information relating to the characteristics of the Earth and its natural phenomena, including data relating to the state ***of*** the environment, is obtained from active or passive sensors on Earth satellites; ***(2)*** similar information is collected from airborne or Earth-based platforms; (3) such information may be distributed to earth stations within the system concerned; **(4)** and platform interrogation may be included. This service may also include feeder links necessary for its operation. ***See*** 47 C.F.R. § 2.1.

[5] SRS is a radiocommunication service in which spacecraft or other objects in space are used for scientific or technological research purposes. ***Id.***

[6] An active sensor is an EESS or SRS measuring instrument by means of which information is obtained by transmission and reception of radio waves. ***See*** 47 C.F.R. § 2.1.

- Allocating 550 megahertz of additional spectrum to the **EESS** (active) and SRS (active) on a primary basis in the bands 13.25-13.4 GHz and 35.6-36 GHz. We would also change the primary footnote allocation for active spaceborne sensors in the band 35.5-35.6 GHz to a direct Table listing.

- Allocating 110 megahertz of additional spectrum to the EESS (active) on a primary basis in the band 5350-5460 MHz.

- Upgrading the allocation status of EESS uplinks and meteorological-satellite service ("METSAT') uplinks in the band 401-403 MHz from secondary to primary?

- Allocating the band 410-420 MHz to the SRS on a primary basis for space-to-space transmissions

- Allocating the band 7750-7850 MHz for METSAT downlinks on a primary basis, limited to non-geostationary satellite systems.

- Allocating the band 8400-8450 MHz for **SRS** downlinks from deep space on a secondary basis.

- Allocating the band 25.25-27.5 GHz to the ISS on a primary basis.

- Raising the secondary EESS allocation to primary status in the band 25.5-27 GHz and changing its directional indicator from space-to-space to space-to-Earth.

6. In addition, we propose to: (1) delete the primary **ISS** allocation from the band 32-32.3 GHz; (2) delete the secondary allocation **for** the aeronautical mobile-satellite (route) service ("AMS(R)S") from the band 136-137 MHz; (3) more than double the size of the geographic area in New Mexico and Texas where amateur stations in the band 420-450 MHz would be limited in power and where spread spectrum radiolocation systems in the sub-band 420-435 MHz should not expect to be accommodated; (4) reflect NTIA's recent action, which specified that Federal Government wind profiler radar systems ("wind profilers") will operate in the sub–band 448-450 MHz; (5) permit U.S. flagged ships to use more spectrum-efficient equipment for on-board mobile radiotelephony communications in areas outside the territorial waters of the United States; (6) delete unused allocations for the International Fixed Public Radiocommunication Services ("IFPRS") from the bands 2.1-2.2 GHz and 10.7-11.7 GHz; and (7) allocate the band 14-14.5 GHz to the mobile-satellite (Earth-to-space) except aeronautical mobile-satellite service on a secondary basis. We also propose to make numerous ministerial amendments to **Part** 2 of **our** Rules.

III. DISCUSSION

7. In the United States, radio spectrum may be allocated to either Federal Government **or** non-Federal Government use exclusively, or for Federal and non-Federal Government shared **use.**[8] The Commission is charged with domestic implementation of both Federal and non-Federal Government allocations.

8. In response to various petitions for rulemaking, we have previously addressed in a number of other proceedings many allocation changes from the 1992 World Administrative Radio Conference ("WARC-92") and the 1995 and 1997 World Radiocommunication Conferences ("WRC-95"

[1] The meteorological-satellite service is an **EESS** for meteorological purposes. **See 47 C.F.R.§ 2.1**

[8] ***See*** **47 C.F.R. § 2.105(b).**

and "WRC-97").[9] In this proceeding, we turn to many of the remaining allocation changes from these conferences that have not previously been considered, including several changes sought mainly at the request of NTIA.[10] Most of the allocation changes requested by NTIA are in spectrum that is either Federal Government exclusive spectrum or in Federal and non-Federal Government shared spectrum where non-Federal Government allocations are on a secondary basis."

9. We also address the RNSS allocation changes from the 2000 World Radiocommunication Conference ("WRC-2000").[12] On September 28, 2001, Lockheed Martin Corporation ("Lockheed Martin") filed a Petition for Rule Making, requesting that the WRC-2000 RNSS allocations in the bands 1164-1215 MHz and 1559-1610 MHz be implemented domestically and that these frequency bands be added to **Part** 25 of our Rules."

10. Further, we are taking this opportunity to address some allocation issues that were not WRC issues but which fall between 28 MHz and 36 GHz. These proposals include downgrading the primary flight test and radiolocation allocations in the band 2320–2345 MHz to secondary status, deleting the limited BSS and FSS allocations from the band 2500-2690 MHz, deleting unused IFPRS allocations from the bands 2.1-2.2 GHz and 10.7-11.7 GHz, and making various ministerial amendments that will clean-up and update our Rules. These proposals would remove confusing and unnecessary regulations and potentially prevent occurrences of interference.

A. Generic MSS at L-Band

1. Background

11. In the United States, the bands 1530-1544 MHz (downlinks) and 1626.5-1645.5 MHz (uplinks) **are** allocated to the MMSS and the MSS on a co-primary basis. Through its adoption of

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[9] ***See Final Acts of the World Administrative Radio Conference for Dealing with Frequency Allocarions in Certain Parts of the Spectrum (WARC-92)***, Malaga-Torremolinos, 1992 (***"WARC-92 Final Acts"); Final Acts of the World Radiocommunication Conference (WRC-95)***, Geneva, 1996 (***"WRC-95 Final Acts");*** and ***Final Acts of the World Radiocommunication Conference (WRC-97)***, Geneva, 1997 (***" WRC-97 Final Acts").*** In response to petitions for rule making, we initially dealt with WRC allocation changes on a piece-meal basis in order **to** more rapidly respond to industry needs. ***See, e.g., Amendment of Parts 2 and 25 of the Commission's Rules to Allocate the 13.75-14.0 GHz Band to the Fixed-Satellite Service,*** ET Docket No. 96-20, ***Reporr and Order,*** 11 FCC Rcd 11,951 (1996).

[10] Recently, we began a process to systematically consider all remaining WRC allocation changes. We divided these proceedings into the following frequency ranges: Below 28 MHz, 28 MHz-36 GHz, 36-51 GHz ("V-band"), 50.2-71 GHz, 71-76 GHz ("70/80/90 GHz NPRM"), and Above 76 GHz. With the adoption of this Notice of Proposed Rule Making, we have completed our consideration of all WRC allocation changes, except for the WRC-2000 realignment of the frequency bands above 76 GHz, which will be attended to in a separate future proceeding. ***See, e.g., Amendment of Pan 2 of the Commission's Rules to Allocate Additional Spectrum to the Inter-Satellite, Fixed, and Mobile Services and to Permit Unlicensed Devices to Use Certain Segments in the 50.2-50.4 GHz and 51.4-71.0 GHz Bands,*** ET Docket No. 99-261, ***Report and Order,*** 15 FCC Rcd 25264 (2000).

[11] Stations of a secondary service shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date, and cannot claim protection from harmful interference from stations of a primary service **to** which frequencies are already assigned or may be assigned at a later date. **See** 47 C.F.R. § 2.105(c)(2).

[12] ***See Final Acts of the World Radiocommunication Conference (WRC-2000)***, Istanbul, 2000 (***"WRC-2000 Final Acts").***

[13] ***See*** Lockheed Martin Petition for Rule Making, received September 28, 2001; placed ***on*** public notice on November 15, 2001, in Rep. No. 2512, therein designated as RM-10331.

footnote US315,[14] the Commission requires that MMSS distress and safety communications have priority access and real-time preemptive capability in these bands over MSS routine, non-safety related public correspondence.[15] In addition, the band 1525-1530 MHz is allocated to the MSS on a primary basis and the band 1525-1535 MHz is allocated to the mobile service on a secondary basis, limited to aeronautical telemetry. Footnote US78 states, inter *alia,* that permissible use of the frequency 1525.5 MHz includes telemetry associated with launching and reentry into the Earth's atmosphere as well as any incidental orbiting prior to reentry of "manned objects" undergoing flight tests.[16] Together, this spectrum is known as "lower L-band."

12. The bands 1544-1545 MHz (downlinks) and 1645.5-1646.5 MHz (uplinks) are allocated to the MSS on an exclusive primary basis. Through its adoption of footnotes 5.356 and 5.375, the Commission requires that the use of these bands be limited to distress and safety communications.[17]

13. The bands 1545-1559 MHz (downlinks) and 1646.5-1660.5 MHz (uplinks) are allocated to the AMS(R)S[18] on a primary basis and are known as "upper L-band." Most of upper L-band is also allocated to the MSS, as follows: the bands 1545-1549.5 MHz (downlinks) and 1646.5-1651 MHz (uplinks) are allocated on a secondary basis, and the bands 1549.5-1558.5 MHz (downlinks) and 1651-1660 MHz (uplinks) are allocated on a primary basis. Through its adoption of footnote US308, the Commission requires that AMS(R)S requirements that cannot be accommodated in the dedicated AMS(R)S bands (1558.5-1559 MHz and 1660-1660.5 MHz) or in the secondary MSS bands (1545-1549.5 MHz and 1646.5-1651 MHz) have priority access and real-time preemptive capability over routine, non-safety related public correspondence in the primary MSS bands (1549.5-1558.5 MHz and 1651-1660 MHz).[19]

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[14] Footnote US315 reads as follows: In the frequency bands 1530-1544 MHz and 1626.5-1645.5 MHz maritime mobile-satellite distress and safety communications, *e.g.*, GMDSS, shall have priority access with real-time preemptive capability in the mobile-satellite service. Communications of mobile-satellite system stations not participating in the GMDSS shall operate on a secondary basis to distress and safety communications of stations operating in the GMDSS. Account shall be taken of the priority of safety-related communications in the mobile-satellite service. See 47 C.F.R. § 2.106.

[15] Public correspondence is any telecommunication which the offices and stations must, by reason of their being at the disposal of the public, accept for transmission. *See* 47 C.F.R. § 2.1.

[16] Footnote US78 reads as follows: "In the mobile service, the frequencies between 1435 and 1535 MHz will be assigned for aeronautical telemetry and associated telecommand operations for flight testing of manned or unmanned aircraft and missiles, or their major components. Permissible usage includes telemetry associated with launching and reentry into the Earths atmosphere as well as any incidental orbiting prior to reentry of manned objects undergoing flight tests. The following frequencies are shared with flight telemetry mobile stations: 1444.5, 1453.5, 1501.5, 1515.5, 1524.5 and 1525.5 MHz." *See* 47 C.F.R. § 2.106. footnote US78

[17] In the 2001 Edition of the ITU Radio Regulations, the "S" has been dropped from the footnote numbering. We have recently implemented this change in our Rules. *See Amendment of Part 2 of the Commission's Rules to Make Non-Substantive Revisions to the Table of Frequency Allocations, Order,* DA 02-1872, rel. August 5, 2002.

[18] AMS(R)S is an aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes. See 47 C.F.R. § 2.106.

[19] Footnote US308 reads as follows: In the frequency bands 1549.5-1558.5 MHz and 1651-1660 MHz, the Aeronautical-Mobile-Satellite (R) requirements that cannot be accommodated in the 1545-1549.5 MHz, 1558.5-1559 MHz, 1646.5-1651 MHz and 1660-1660.5 MHz bands shall have priority access with real-time preemptive capability for communications in the mobile-satellite service. Systems not interoperable with the aeronautical mobile-satellite (R) service shall operate on a secondary basis. Account shall be taken of the priority of safety-related communications in the mobile-satellite service. *See* 47 C.F.R. § 2.106.

14. Prior to WRC-97, certain sub-bands within L-band were allocated internationally to various services within the MSS.[20] At WRC-97, the United States proposed "generic" **MSS** allocations throughout L-band, *i.e.*, to expand the limited AMS(R)S, land mobile-satellite service ("LMSS"), and MMSS allocations in various sub-bands into the more broadly defined category of MSS.[21] In its WRC-97 proposals, the United States stated that the needs of the MMSS and AMS(R)S can be accommodated within the generic **MSS,** provided that suitable priority for the aeronautical and maritime safety services is adopted.[22] The U.S. also stated that worldwide generic L-band **MSS** allocations would provide for more efficient use of the radio spectrum, facilitate the introduction of MSS globally, and, with appropriate provisions, maintain priority for aeronautical and maritime safety communications. In addition, the U.S. stated that generic MSS allocations would also increase the amount of spectrum available for AMS(R)S communications on a priority basis outside the United States and would make the entire allocation available for maritime and aeronautical MSS for routine communications.

15. WRC-97 allocated the bands 1525-1559 MHz (downlinks) and 1626.5-1660.5 MHz (uplinks) to the MSS on a primary basis throughout the world.[23] The general structure of the MSS allocation emphasizes safety communications for MMSS in much of lower L-band through the adoption of footnote 5.353A[24] and for AMS(R)S in upper L-band through the adoption of footnotes 5.357A and 5.362A.[25]

Downlink Band (MHz)	Uplink Band (MHz)	Region 1	Regions 2 and 3	Country footnotes for the U.S. and other nations
1525-1530	1626.5-1631.5	MMSS Secondary LMSS'	MSS	N/A
1530-1533	1631.5-1634.5	MMSS LMSS		MSS. with MMSS distress & safety communications having priority access & immediate availability over all other MSS (5.353)
1533-1544	1634.5-1645.5	MMSS Secondary LMSS'		
1544-1545	1645.5-1646.5	MSS (limited to distress & safety)		N/A
1545-1555	1646.5-1656.5	AMS(R)S; public correspondence with aircraft may be authorized, but must cease immediately, if necessary. to permit transmission of messages with priority 1-6.		
1555-1559	1656.5-1660.5	LMSS; aircraft & ships may be authorized to communicate with LMSS satellites.		MSS (5.361). with AMS(R)S having priority access & immediate availability over all other MSS (5.362)

[21] This MSS designation is termed generic in contrast to the existing specific service designations, but the specific service designations are permitted in the MSS category. That is, under a MSS allocation, a licensee can offer AMS(R)S, LMSS, and MMSS services.

[22] See U.S. WRC-97 Proposals at 78. In the United States, the Commission has already provided for the priority of aeronautical and maritime safety communications through its adoption of footnotes US308 and US315, respectively. See 47 C.F.R. § 2.106, footnotes US308 and US315. The Commission has also implemented the Global Maritime Distress and Safety System ("GMDSS). See 47 C.F.R. Part 80, Subpart W. The bands 1530-1544 MHz and 1626.5-1645.5 MHz are the satellite general distress and safety communications and calling frequencies.

[23] See WRC-97 *Final Acts* at 21-32.

[24] The GMDSS priority access and immediate availability requirement has never applied to the band 1525-1530 MHz.

[25] See 47 C.F.R. § 2.106, footnotes 5.353A, 5.357A, and 5.362A

16. In February 2002, we established licensing policies to govern MSS use of upper and lower L-band.[26] Specifically, we assigned up to 20 megahertz of upper and lower L-band spectrum to Motient Services, Inc. ("Motient"), the only U.S. MSS system currently authorized in L-band. We also incorporated into Part 25 of our Rules specific operational parameters and technical requirements to ensure that the integrity of maritime distress and safety communications will not be compromised by MSS operation in the lower L-band.[27]

2. Proposal

17. Domestically, we have previously implemented most of our WRC-97 generic MSS proposals. However, routine, non-safety related MSS public correspondence is currently precluded in the uppermost one megahertz of upper L-band spectrum (1558.5-1559 MHz and 1660-1660.5 MHz) and may be provided in nine megahertz of upper L-band spectrum only on a secondary basis (1545-1549.5 MHz and 1646.5-1651 MHz). Accordingly, we propose to expand the permitted primary services from AMS(R)S to all MSS in the bands 1545-1549.5 MHz, 1558.5-1559 MHz, 1646.5-1651 MHz, and 1660-1660.5 MHz.

18. In addition, we propose to take the following non-substantive, "clean-up" actions: (1) delete the superfluous MMSS allocations from bands 1530-1544 MHz and 1626.5-1645.5 MHz, (2) delete the now superfluous secondary MSS allocations from the bands 1545-1549.5 MHz and 1646.5-1651 MHz, and (3) delete the superfluous AMS(R)S allocations from the bands 1549.5-1558.5 MHz and 1651-1660 MHz. The effect of these proposals is that the band 1525-1559 MHz would be allocated for MSS downlinks on a primary basis and the 1626.5-1660.5 MHz would be allocated for MSS uplinks on a primary basis. We are maintaining footnotes US308 and US315 concerning the priority to be afforded distress and safety communications. We believe that these generic MSS allocations will provide Motient and others with maximum flexibility, without hindering the use of this spectrum for distress and safety communications. We request comment on our generic MSS proposals. In particular, we request comment on whether footnote US308 should be maintained, modified, or replaced by international footnotes 5.357A and 5.362A. Table 1, below, summarizes these proposals.

19. We also propose to update Part 25 of our Rules by stating that the bands 1525-1559 MHz and 1626.5-1660.5 MHz are available use by L-band MSS systems. Further, we propose to state that the use of the bands 1544-1545 MHz and 1645.5-1646.5 MHz is limited to distress and safety

20. We also request comment on whether the secondary mobile allocation, which is limited to aeronautical telemetry, should be deleted from the band 1525-1535 MHz in the United States Table of Frequency Allocations ("U.S. Table"). We observe that this band is used by mobile subscriber units to receive weak satellite signals and therefore, request comment on whether co-frequency transmissions from aircraft can cause harmful interference to the primary MSS. We observe that while there are no non-Federal Government flight test licensees in the band 1525-1535 MHz, there are Federal Government flight test operations in this band. We request comment on whether the aeronautical telemetry operations in the band 1525-1535 MHz can be relocated to either the band 1435-1525 MHz or to the band 2310-2385

[26] *See Establishing Rules and Policies for the use of Spectrum for Mobile Sarellire Services in the Upper and Lower L-band,* IB Docket NO. 96-132, *Report and Order,* FCC 02-24, released February 7, 2002 *("L-band Policy and Rules R&O").*

[27] *See L-band Policy and Rules R&O,* Appendix A, Section 25.136(d) and (e).

[28] See Appendix, Section 25.202(4)(iii).

MHz.[29] If the secondary mobile allocation in the band 1525-1535 MHz is deleted, then we propose to revise footnote US78 to remove the frequency 1525.5 MHz, which can be used for both aircraft and spacecraft telemetry.

Table 1: Generic MSS

(All allocations are primary, except as noted)

Band (MHz)	Existing Allocations	Proposed Allocations	Summary of Main Changes
1525-1530	MSS (downlinks) Secondary mobile (aeronautical telemetry) US78 (permissible usage includes spacecraft telemetry)	1525-1535 MHz MSS (downlinks) US315 Secondary mobile (aeronautical telemetry) US78	Request comment on whether the secondary mobile allocation that is limited to aeronautical telemetry should be deleted.
1530-1535	MSS (downlinks) MMSS (downlinks) Secondary mobile (aeronautical telemetry) US78 US315 (MMSS distress & safety has priority access & real-time preemptive capability over other MSS)		Delete unneeded MMSS allocations. Request comment on whether the secondary mobile allocation that is limited to aeronautical telemetry should be deleted.
1535-1544	MSS (downlinks) MMSS (downlinks) US315	1535-1559 MHz MSS (downlinks) 5.356 US308 US309 US315	
1544-1545	MSS (downlinks) 5.356 (limits use to distress and safety communications)		No change.
1545-1549.5	AMS(R)S (downlinks) US309 (terrestrial extension of AMS(R)S permitted)		Expand AMS(R)S to all MSS in the bands 1545-1549.5 MHz & 1558.5-1559 MHz; delete superfluous secondary MSS allocation from 1545-1549.5 MHz; delete unneeded AMS(R)S allocation from 1549.5-1558.5 MHz.
1549.5-1558.5	AMS(R)S (downlinks) US309 MSS (downlinks) US308 (AMS(R)S has priority access & real-time preemptive capability over other MSS)		
1558.5-1559	AMS(R)S (downlinks) US309		
1626.5-1645.5	MSS (uplinks) MMSS (uplinks) US315	1626.5-1660 MHz MSS (uplinks) 5.375 US308 US309 US31	Delete unneeded MMSS allocation.
1645.5-1646.5	MSS (uplinks) 5.375 (limits use to distress and safety communications)		No change.
1646.5-1651	AMS(R)S (uplinks) US309 Secondary MSS (uplinks) US308		Expand AMS(R)S to all MSS in the bands 1646.5-1651 & 1660-1660.5 MHz; delete superfluous secondary MSS allocation from 1646.5-1651 MHz; delete unneeded AMS(R)S allocation from 1651-1660 MHz.
1651-1660	AMS(R)S (uplinks) US309 MSS (uplinks) US308		
1660-1660.5	AMS(R)S (uplinks) US308 US309 RADIO ASTRONOMY	MSS (uplinks) US308 US309 RADIO ASTRONOMY	

B. RNSS Allocations

1. Background

21. GPS, which currently consists of 24 satellites operated by the U.S. Government, is authorized under the RNSS allocation. These satellites allow any person with a GPS receiver to

[29] We are proposing to permit aeronautical telemetry operations in the band 2320-2345 MHz to continue on a secondary basis to Satellite DARS. See ¶¶ 47-49, infra.

determine his or her precise longitude, latitude, altitude, and time anywhere on the planet.[30] GPS currently uses the RNSS downlink allocations in the bands 1215-1240 MHz and 1559-1610 MHz. GPS provides two levels of service: a Standard Positioning Service ("SPS") using the L1 frequency[31] and a Precise Positioning Service ("PPS") using the L1 and L2 frequencies.[32] SPS is available to all users on a continuous, worldwide basis, free of any direct user charge.

22. As discussed below, we propose to allocate the band 1164-1189 MHz to the RNSS (space-to-Earth, space-to-space) on a primary basis for a new GPS signal. We also propose to add a space-to-space directional indicator to the existing primary RNSS allocations in the bands 1215-1240 MHz and 1559-1610 MHz.[33]

a. Current Uses of the Band 960-1215 MHz

23. Prior to WRC-2000, the band 960-1215 MHz was allocated to the aeronautical radionavigation service ("ARNS") on a primary basis throughout the world. International footnote 5.328 also states that ARNS use of the band 960-1215 MHz is reserved on a worldwide basis for the operation and development of airborne electronic aids to air navigation and any directly associated ground-based facilities.

24. In the United States, the band 960-1215 MHz is Federal and non-Federal Government shared spectrum that is allocated to ARNS on a primary basis. The Commission has added international footnote 5.328 to the United States Table, thereby reserving the band 960-1215 MHz for the use and development of airborne electronic aids to air navigation and any directly associated ground-based facilities. This band is heavily used for safety-of-life services within the national and international airspace systems. Nearly all aspects of aircraft identification, tracking, control, navigation, collision avoidance, and landing guidance are carried out in this band. Major ARNS systems in this band include Distance Measuring Equipment ("DME"), Air Traffic Control Beacons ("ATCRBS"), the military's tactical air navigation system ("TACAN"), and the Traffic Alert and Collision Avoidance System ('TCAS"). These aeronautical systems are not only essential to civil and military aircraft, but also to special users such as the U.S. Space Shuttle program. In addition, footnote US224 states that Federal Government systems utilizing spread spectrum techniques may, under limited circumstances, operate in the band 960-1215 MHz on the condition that harmful interference is not caused to ARNS.[34]

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[30] Each GPS satellite takes 12 hours to orbit the Earth. These satellites are equipped with accurate clocks *so* that they can broadcast signals with a precise time message. The GPS receiver uses the time signals from multiple satellites to determine precise latitude, longitude, and altitude.

[31] The International Civil Aviation Organization ("ICAO) has designated the L1 links of GPS and the Russian GLONASS system as the principal elements of the Global Navigation Satellite System ("GNSS"). The GPS L1 SPS ranging signal is a 2.046 megahertz null-to-null bandwidth signal centered about 1575.42 MHz. The transmitted ranging signal that comprises the GPS-SPS is not limited to a null-to-null signal and extends through the band 1563.42-1587.42 MHz. The Wide Area Augmentation System ("WAAS"), when it becomes operational, will utilize the same band and carrier frequency as GPS L1. See ¶36, *infra* for a description of WAAS.

[32] The GPS L2 link shares the band 1215-1240 MHz with radiolocation services, such as military radars. The 1240-1260 MHz band is shared by GLONASS L2 and the nationwide joint surveillance system radar network operated by the Federal Aviation Administration and the Department of Defense. The GPS L2 carrier frequency is 1227.60 MHz. Although the L2 frequency is currently not part of SPS, the U.S. Government has decided to add a second non-safety-of-life coded signal at the GPS L2 frequency on satellites scheduled for launch beginning in 2005.

[33] See WRC-2000 *Final Acts* at 17 and 20.

[34] See 47 C.F.R. § 2.106, footnote US224.

h. Current Uses of the Band 1215-1240 MHz

25. Prior to WRC-2000, the band **1215-1240 MHz** was allocated for radiolocation, RNSS downlinks, EESS (active), and SRS (active) on a co-primary basis throughout the world. However, active spaceborne sensors cannot cause interference to, claim inference from, or otherwise impose constraints on the operation or development of the radiolocation service and RNSS downlinks.[35] In addition, the use of the **RNSS** downlink allocation is subject to not causing harmful interference to the radionavigation service in certain countries.[36]

26. In the United States, the band **1215-1240 MHz** is Federal Government exclusive spectrum that is allocated for RNSS downlinks and to the radiolocation service on a co-primary basis.[37] Radiolocation stations installed on spacecraft may also be employed for the EESS and SRS services on a secondary basis?' The major radiolocation systems in this band are operated by the Department of Defense. Radars in this band are also mounted on tethered balloons along the southern border of the U.S. for drug interdiction purposes to detect low-flying aircraft entering U.S. airspace. GPS makes use of this RNSS downlink allocation with a center frequency at **1227.6 MHz,** which is generally known as the **L2** link.

c. Current Uses of the Band 1559-1610 MHz

27. Prior to WRC-2000, the band **1559-1610 MHz** was allocated to the **ARNS** and for **RNSS** downlinks on a co-primary basis throughout the world. In the United States, the band **1559-1610 MHz** is Federal and non-Federal Government shared spectrum and the **ARNS** and **RNSS** allocations have been implemented. **GPS** is the major use of the band **1559-1610 MHz.**

28. The Commission has also adopted two United States footnotes for this band. Footnote **US208** states that planning and use of the band **1559-1610 MHz** necessitate the development of technical and/or operational sharing criteria to ensure the maximum degree of electromagnetic compatibility with existing and planned systems within the band.[39] Footnote US260 states that aeronautical mobile communications, which are an integral part of ARNS systems, may be satisfied in several bands, including the band **1559-1626.5 MHz.**[40]

2. . GPS Applications in Space

29. At **WRC-2000,** the U.S. proposed the addition of the space-to-space direction to the RNSS allocation in the bands **1215-1240 MHz** and **1559-1610 MHz.**[41] In support of this proposal, the United States noted that while RNSS systems such as **GPS** and **GNSS** are primarily used in the downlink direction to provide service to terrestrial users, these systems are increasingly being used in the space-to-

[35] **See 47** C.F.R. § 2.106, footnote 5.332.

[36] **See 47** C.F.R. § 2.106, footnote 5.329.

[37] Radiolocation use is primarily for the military services. **See 47** C.F.R. § 2.106, footnote G56.

[38] **See 47** C.F.R. § 2.106, footnote 5.333. In this proceeding, we are also proposing to upgrade this secondary allocation to primary status and to specify that its use is limited to active spaceborne sensors. **See** ¶ 69, *infra.*

[39] **See 47** C.F.R. § **2.106,** footnote US208.

[40] **See 47** C.F.R. § 2.106, footnote US260

[41] **See** United States of America Proposals for the Work of the Conference, Document 12-E, dated January 12, 2000, Proposals for agenda item 1.15.2.

space direction by spaceborne users. Spaceborne uses include applications such as spacecraft three-dimensional positioning and velocity determination; three-axis attitude control; precise time synchronization; precision orbit determination, and atmospheric science. The U.S. observed that use of RNSS signals is presently protected only through a downlink allocation in the bands 1215-1240 and 1559-1610 MHz. Recognizing current and future operational use of spaceborne RNSS receivers for scientific and commercial applications, the U.S. stated that it is important to add the space-to-space direction to the existing RNSS allocations so that these uses can be taken into consideration if changes to these frequency bands are contemplated. Finally, the U.S. noted that the ITU-R has concluded that the addition of a space-to-space direction to the RNSS bands at 1215-1240 MHz and 1559-1610 MHz will not cause any additional interference to other services since it involves no change to downlink transmissions.

30. At WRC-2000, a space-to-space directional indicator was added to the existing primary RNSS allocation in the bands 1215-1240 MHz and 1559-1610 MHz.[42] NTIA requests that the space-to-space directional indicator be added to the primary RNSS allocation in the band 1215-1240 MHz for Federal Government use and in the band 1559-1610 MHz for both Federal and non-Federal Government use.[43]

31. Lockheed Martin states that it currently provides the geostationary component of the Wide Area Augmentation System ("WAAS") for demonstration purposes, and that it will be necessary for a commercial operator to obtain a license to build and deploy GPS augmentation broadcast satellites." Therefore, Lockheed Martin also requests that the space-to-space directional indicator be added to the primary RNSS allocation in the Federal and non-Federal Government shared band at 1559-1610 MHz and in the Federal Government exclusive band at 1215-1240 MHz. In addition, Lockheed Martin requests that the RNSS allocations in band 1559-1610 MHz be added to Section 25.202(a) of our Rules.

3. GPS Signal and Safety-of-Life Applications

32. At WRC-2000, the U.S. proposed to add a third civil GPS signal ("L5") that can meet the needs of critical safety-of-life applications, such as civil aviation, at 1176.45 MHz on satellites scheduled for launch beginning in 2007. In support of its L5 proposal, the U.S. stated that additional RNSS signals would greatly enhance the accuracy, reliability and robustness of the civil GPS by enabling more effective corrections to be made for the time delay effects of the ionosphere[45] on the signals from space.[46] Further, the U.S. observed that the International Civil Aviation Organization has requested an additional civil GPS signal to support requirements for the Global Navigation Satellite System ("GNSS") and for space-based augmentation systems. The U.S. stated that aeronautical users require that the signal operate in ARNS spectrum, which would also include the possibility of RNSS augmentation systems. The U.S. also stated that the required bandwidth of its proposed L5 signal was 24 megahertz, subsequently revised to 25

[42] *See WRC-2000 Final* Acts at 17 and 20.

[43] See Letter from Associate Administrator, Office of Spectrum Management, NTIA, to Acting Chief, Office of Engineering and Technology ("OET"), FCC, dated July 18, 2001 ("July 2001 NTIA Letter").

[44] See Lockheed Martin Petition at 7-8.

[45] The ionosphere is that part of the Earth's outer atmosphere where ions and free electrons are normally present in quantities sufficient to affect the propagation of radio waves.

[46] *See* United States of America Proposals for the Work of the Conference, Document 12-E, dated January 12, 2000, Proposals for agenda item 1.15.1.

megahertz (1164-1189 MHz), and that technical studies show compatibility between existing operational ARNS systems and the L5 signal.[47]

33. WRC-2000 adopted international footnote 5.328A, which allocates the band 1164-1215 MHz for RNSS downlinks and space-to-space transmissions on a primary basis throughout the world and specifies provisional aggregate power flux-density ("pfd") limits."

34. NTIA requests that we not propose the domestic adoption of international footnote 5.328A because the U.S. Government currently only has plans to use a portion of this RNSS allocation (I 164-1189 MHz) for its GPS system, and uses for the remainder of the RNSS allocation have not been defined, nor have technical compatibility studies been performed.[49] NTIA requests that consideration of the remaining portion of this RNSS allocation (1189-1215 MHz) be deferred at this time?' **NTIA** and Federal agencies are investigating the possibility of extending to 1215 MHz this RNSS allocation within the United States, in accordance with footnote 5.328A.[51] In addition, if a pfd limit needs to be adopted domestically, NTIA recommends that it be added to Part 25 of our Rules, not included in a footnote to the Table of Frequency Allocations?' Therefore, **NTIA** recommends, at this time, that we propose to adopt the following United States footnote:

> USyyy The band 1164-1189 MHz is also allocated to the radionavigation-satellite service (space-to-Earth, space-to-space) on a primary basis, In this band, stations in the radionavigation-satellite service shall not cause harmful interference to, nor claim protection from, stations of the aeronautical radionavigation service.

35. In its Petition for Rule Making, Lockheed Martin requests that the entire RNSS hand at 1164-1215 MHz be implemented domestically, stating that it may be more expedient for us to specify the entire RNSS band, rather than just the spectrum that the U.S. Government system needs (1164-1189 MHz).[53] Lockheed Martin agrees with **NTIA** that the provisional aggregate pfd limit should not be shown in the U.S. Table because there are significant technical and regulatory questions about the ability of an aggregate pfd limit to adequately protect ARNS receivers from interference.[54] In addition, Lockheed Martin requests that the RNSS allocations in the band 1164-1215 MHz be added to Section 25.202(a) of our Rules.

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[47] On August 8,2002, NTIA revised its request for the L5 bandwidth from 1164-1188 MHz to 1164-1189MHz. **See** Letter from Acting Associate Administrator. Office of Spectrum Management, NTIA to Chief, OET, FCC, dated August 8, 2002 ("NTIA RNSS Letter").

[48] **See 47** C.F.R. § 2.106, footnote 5.328A.

[49] *See* NTIA RNSS Letter. **See** also July 2001 NTIA Letter.

[50] **See** July 2001 NTIA Letter at Attachment 1.

[51] **See** NTIA RNSS Letter.

[52] **See** July 2001 NTIA Letter.

[53] *See* Lockheed Martin Petition for Rule Making at 12.

[54] *Id.* at 13.

36. In late-filed comments in RM-10331, the Boeing Company ("Boeing") also requests that the entire international **RNSS** band at 1164-1215 MHz be implemented domestically, stating that allocation of the entire band could facilitate spectrum sharing between multiple RNSS networks?'

4. Proposal

37. Currently, SPS-GPS accuracy is about 20 meters (about 65.6 feet) from true position.[56] Lockheed Martin states that the Federal Aviation Administration ("FAA") has determined that commercial aviation requires positional accuracy within 7.6 meters (about 25 feet) in both the horizontal and vertical directions to support flight navigation, from enroute through precision approach.[57] **RNSS** stations in the band 1164-1189 MHz, in conjunction with the transmission of differential correction data and related information, can accomplish this. Accordingly, as requested by **NTIA,** we propose to adopt a new United States footnote (USyyy). which would allocate the band 1164-1189 MHz for **RNSS** downlink and space-to-space transmissions on a primary basis."

38. We observe that differential **RNSS** correction data and related information is transmitted in a data link, and as such, is sometimes not within the **RNSS.** Examples of current differential **RNSS** systems for the purpose of augmenting GPS include WAAS, which is an **RNSS** system being implemented by the FAA that also provides correction information transmitted from satellites, and the Local Area Augmentation System ("LAAS"), which is a system being tested by the FAA that transmits correction information from ground stations. In order ***to*** clarify this point, we propose to add the following definitions to Part 2 of **our** Rules:

> ***Differential Radionavigation Satellite Service (Differential RNSS) Station.*** **A** station used for the transmission of differential correction data and related information (such as ionospheric data and **RNSS** satellite integrity information) as an augmentation to an **RNSS** system **for** the purpose of improved navigation accuracy.
>
> ***Differential Global Positioning System (DGPS) Station.*** A differential **RNSS** station for specific augmentation of GPS.

39. These proposals would provide commercial entities with an opportunity to assist the FAA in its continuing efforts to modernize the national airspace system. In particular, we observe that several efforts are currently underway to augment the positioning information provided by GPS and to raise its level of accuracy **so** as to meet commercial aviation's safety-of-life requirements. Among these efforts is the WAAS, which will monitor the performance of the GPS system through a network of ground stations. Each ground station will compare its known position with its received GPS position and will transmit this differential data to one or more master stations. At the master stations, the differential data will be averaged and sent to the geostationary satellites, which will broadcast the derived correction signal and other relevant data using the same frequency as GPS (in this case the same frequency as L5). Commercial entities may operate WAAS under FAA contracts.[59]

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[55] **See** Boeing's late-filed comments, **RM-10331,** received June 25, 2001. We are accepting these late-filed comments in order to have a complete record.

[56] ***Id.*** at **5**.

[57] *Id.* **at** 10.

[58] **See** ¶ 34, ***supra,*** for the text of USyyy

[59] Lockheed Martin currently provides the geostationary satellite component of WAAS and four ground stations under an FAA contract to demonstrate the capabilities of WAAS. Lockheed Martin has an application on tile to

40. We request comment on whether the band 1164-1189 MHz should be added to proposed footnote US343. Proposed footnote US343 provides that DGPS stations may be authorized on a primary basis in the bands 108-117.975 MHz and 1559-1610 MHz for the specific purpose of transmitting DGPS information intended for aircraft navigation.[60]

41. We also seek comment on whether we should allocate domestically the international RNSS allocation at 1189-1215 MHz at this time, and in particular on whether this allocation is needed to support U.S. requirements. We note that studies continue in the international process to determine the aggregate impact of multiple RNSS systems on incumbent ARNS systems. Given the safety-of-life aspects of these ARNS systems, we would not anticipate adopting this additional allocation unless a need is demonstrated and studies are completed.[61] We are not proposing to adopt pfd limits on RNSS systems at this time because the US footnote we propose should ensure protection of ARNS. We request comment on our proposal.

42. We anticipate that numerous terrestrial applications could be offered as a side benefit of WAAS. These applications may include automated farming and mining operations, automobile navigation, automated traffic management, and enhanced maritime navigation. Additional services could be offered by integrating a user's positional information with a user generated communications message for remote tracking, theft prevention/recovery, and search and rescue. We also seek comment on whether these benefits can be achieved through the use of other satellite systems and frequency bands, such as current MSS systems.

43. In addition, we propose to add a space-to-space directional indicator to the primary RNSS allocation in the bands 1215-1240 MHz and 1559-1610 MHz, which are currently limited to downlink transmissions. This action would recognize current and future use of spaceborne RNSS receivers for scientific and commercial applications. We decline to add the RNSS frequencies to Section 25.202(a) of our Rules at this time. Such action would be more appropriate in connection with development of service and licensing rules for the RNSS frequency bands, and following development of international technical criteria for operations in these bands.

C. Satellite DARS

1. Background

44. The band 2320-2345 MHz is allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. This service is generally known as Satellite DARS. The Satellite DARS band is also allocated on a secondary basis to the mobile service for non-Federal Government use and to the fixed, mobile, and radiolocation services for Federal Government use. Footnote US328 states that the mobile and radiolocation services are allocated on a primary basis until Satellite DARS has been brought into use.[62] In addition, footnote US328 states that Satellite DARS

provide a Regional Positioning System ("RPS"). Lockheed Martin intends that RPS will he the geostationary component of GNSS. See Lockheed Martin Petition at 7 and 9.

[60] Proposed footnote US343 reads as follows: "Differential-Global-Positioning-System (DGPS) stations may he authorized on a primary basis in the hands 108-117.975 MHz and 1559-1610 MHz for the specific purpose of transmitting DGPS information intended for aircraft navigation." Footnote US343 was originally proposed in *Review of Part 87 of the Commission's Rules Concerning the Aviation Radio Service,* WT Docket No. 01-289, *Notice of Proposed Rule Making,* 16 FCC Rcd 19005 (2001).

[61] *See WRC-2000 Final Acts* at Resolution 605

[62] See 47 C.F.R. § 2.106, footnote US328.

during implementation should minimize its impact on the expendable and reusable launch vehicle frequency 2332.5 MHz to the extent possible. Footnote US276 states that this mobile allocation is limited to aeronautical telemetry and associated telecommand operations ("flight testing").[63] Flight test use of the Satellite DARS band remains permissible in our Rules for the Aviation Services.[64]

45. The bands 2310-2320 MHz and 2345-2360 MHz are allocated to the fixed, mobile, radiolocation, and broadcasting-satellite service (sound) and complementary terrestrial broadcasting services on a co-primary basis for non-Federal Government use. In 1997, we established the Wireless Communications Service ("WCS") on these two bands and permitted WCS licensees the flexibility to offer any of these radiocommunication services.[65] The WCS bands are also allocated to the fixed, mobile, and radiolocation services on a secondary basis for Federal Government use. Footnote US339 states that the WCS bands are also available for flight testing on a secondary basis. However, the bands 2310-2320 MHz and 2345-2360 MHz have been inadvertently removed from Part 87 (Aviation Services) of our Rules.

46. We observe that while non-Federal Government flight test use of the band 2310-2360 MHz is relatively light, many of these licenses are for wide bandwidths that may not be readily re-accommodated in other spectrum.[66] In contrast, Federal Government flight test, fixed, and radiolocation use of the band 2310-2360 MHz is much more extensive.

2. Proposal

47. We note that both of our Satellite DARS licensees (Sirius and XM Radio) are offering service to the public.[67] Thus, we tentatively find that the conditions in footnote US328 have been met. We believe that flight testing can continue in the band 2320-2345 MHz without causing harmful interference to Satellite DARS reception. For example, flight test operations could be performed in remote areas such as White Sands, New Mexico or in less remote areas at lower altitudes. Therefore, we propose to revise footnote US328 to permit flight test operations to continue on a secondary basis in the band 2320-2345 MHz. We propose to delete the radiolocation service from footnote US328 because there are no non-Federal Government radiolocation operations in the Satellite DARS band and because the Federal Government already has a secondary direct Table allocation for this service. We propose to the delete the requirement that Satellite DARS licensees take cognizance of the launch vehicle frequency

[63] *See* 47 C.F.R. § 2.106, footnote US276.

[64] *See* 47 C.F.R. § 87.303(d)(1).

[65] *See Amendment of the Commission's Rules to Establish Part 27, the Wireless Communications Service ("WCS")*, GN Docket No. 96-228, *Report and Order*, 12 FCC Rcd 10785 (1997); *Memorandum Opinion and Order*, 12 FCC Rcd 3977 (1997).

[66] The non-Federal Government flight test licensees in the band 2310-2360 MHz are:

Company & Call Sign	Expiration Date	Aircraft Units	Area of Operation	Transmitter Output Power	Frequencies in MHz	Emission Designator
Learjet Inc. KA98091	04/02/06	10	200 mile radius around Wichita	20 watts	2320.5, 2338.5 2350.5, 2355.5	17M0FXD 4M00F9D
Tracor Flight Systems Inc KA98056	05/07/07	20	200 mile radius around Mojave, CA	10 watts 20 watts	2330.5 2340.5, 2350.5	5M00F2D 1M00F1D, 1M00F8D
Boeing KA98123	11/14/06	5	200 mile radius around Saint Louis	20 watts	2316.5, 2336.5	10M00F9D
Boeing KA98142	07/07/04	8			2352.5	13M00F9D

2332.5 MHz because their systems have been implemented. Accordingly, we propose to revise footnote US328 to read as follows:

> US328 The band 2320-2345 MHz is also available for aeronautical telemetering and associated telecommand operations for flight testing of manned or unmanned aircraft, missiles or major components thereof on a secondary basis to the Satellite Digital Audio Radio Service.

48. We request comment on this proposal, including if we should designate geographic areas where flight testing may continue on a secondary basis. Alternatively, we request comment on whether all secondary allocations should be deleted from the band in order to protect Satellite DARS reception. We note that Satellite DARS is a nation-wide satellite broadcast service and that its mobile receivers could receive interference anywhere secondary operations might occur, especially near flight test ranges.

49. We propose to amend Section 87.303(d)(1) to state that frequencies in the band 2310-2360 MHz may be assigned on a secondary basis for telemetry and telecommand operations associated with the flight testing of manned or unmanned aircraft and missiles, or their major component. We also propose to delete the launch vehicle frequency 2332.5 MHz from Section 87.303(d)(1). In the Table of Frequency Allocations, we propose to add a cross-reference to Part 25, Satellite Communications, in the band 2320-2345 MHz because this band is listed in Section 25.202(a)(6).[68] Likewise, we propose to add a cross-reference to Part 87, Aviation Services, in the band 2310-2390 MHz because these bands are, or are proposed to be, listed in Section 87.303(d)(1). We would delete footnote 5.396 from the band 2310-2360 MHz from the Federal Government Table because it pertains to the broadcasting-satellite service, which is not regulated by NTIA. We would also delete footnote US338 from the band 2310-2320 MHz because it does not pertain to this band. We request comment on all of the above proposals.

D. ITFS/MDS Band

1. Background

50. In the United States, the band 2500-2690 MHz is allocated to the fixed, mobile except aeronautical mobile,[69] BSS, and FSS services on a co-primary basis for non-Federal Government use. The band 2500-2690 MHz is currently used exclusively for fixed purposes by the Instructional Television Fixed Service ("ITFS") and to the Multipoint Distribution Service ("MDS").[70] As an adjunct to the original ITFS use, the BSS allocation is limited by footnote NG101 to "community reception" of educational TV programming and public service information." Similarly, the FSS allocation is limited by footnote NG102 to educational FSS use throughout the United States, except that the FSS allocation

[68] Column 6 of the Table of Frequency Allocations, 47 C.F.R. § 2.106, contains cross references to other Commission rule parts.

[69] An allocation to the mobile except aeronautical mobile service means that land mobile and maritime mobile services may be provided, but that aeronautical mobile services are prohibited.

[70] The MDS channels that use the band 2596-2644 MHz are known as the Multichannel Multipoint Distribution Service. See 41 C.F.R. § 21.2.

[71] Community reception in the broadcasting-satellite service is the reception of emissions from a BSS space station by receiving equipment, which in some cases may be complex' and have antenna larger than those used for individual reception, and intended for use (1) by a group of the general public at one location; or (2) through a distribution system covering a limited area. See 41 C.F.R. § 2.1. The community reception concept appears to have been overtaken by individual reception of BSS programming, such as that offered by DirecTV and the DISH Network.

may be also used for common carrier purposes in Alaska, Hawaii, and certain Pacific islands. In order to preserve spectrum for FSS use in Alaska, footnote NG47 states that the band 2655-2690 MHz is not available for use by terrestrial services. These limited BSS and FSS allocations are unused.[72]

51. WRC-2000 identified the band 2500-2690 MHz for use by third generation wireless systems ("3G"). In order to provide ITFS and MDS licensees with additional flexibility, we recently allocated the band 2500-2690 MHz to the mobile except aeronautical mobile service as reflected above.[73] However, no mobile service rules were established due to sharing issues with fixed services.[74] In the ***New Advanced Wireless Services First R&O and MO&O***, we found that sharing between terrestrial systems and MSS downlinks in the band 2500-2520 MHz and MSS uplinks in the band 2670-2690 MHz would not be feasible?' Specifically, we found that MSS use of these bands in the United States would present substantial technical challenges and that MSS already has access to a significant amount of spectrum below 3 GHz to meet its needs for the foreseeable future.

2. Proposal

52. The band 2500-2690 MHz is heavily used by the ITFS and MDS licensees to provide traditional one-way analog video services. Many MDS licensees are upgrading their systems to provide two-way digital, point-to-multipoint fixed services for the delivery of high-speed internet access to the public, which is in addition to or in lieu of traditional video programming. In addition, the new mobile allocation may be implemented in the future. When the limited FSS and BSS allocations were made, two-way, point-to-multipoint MDS data services at 2500-2690 MHz were not anticipated. We believe that FSS and BSS operations in the band 2500-2690 MHz could affect the reliability of point-to-multipoint channels and low-power consumer response channels. Therefore, we propose to delete the unused and limited FSS and BSS allocations from the band 2500-2690 MHz in order to remove regulatory uncertainty from this spectrum. As a consequence of the proposal to delete the BSS and FSS allocations, we propose to delete footnotes NG101 and NG102, which limit the use of these allocations. In addition, we propose to delete footnote NG47 so as to make the band 2655-2690 MHz available for ITFS/MDS use in Alaska.[76] This action will align spectrum use in Alaska with the rest of the nation. We

[72] We observe that Canada has advanced published and has filed a coordination request for a seven BSS GSO satellite system with the ITU that would, if approved, provide television and other services to passengers on aircraft using the band 2535-2655 MHz. In addition, because the band 2500-2690 MHz was identified at WRC-2000 as an additional band for IMT-2000 systems, WRC-03 agenda item 1.34 is reviewing the threshold valuse for BSS (sound) systems using NGSO satellites in the sub-band 2630-2655 MHz. In its prelimary views, the United States recognizes the need for a thorough analysis, and review at WRC-03 of the pfd threshold values and that the result should not place undue constraints on either terrestrial or NGSO BSS (sound) systems. ***See*** United States Preliminary View for WRC-03 Agenda Item 1.34, document RCS-1363_rev3, dated February 21, 2002. In addition, because invites 2 of Resolution 539 also refers to the band 2535-2655 MHz, we anticipate that the U.S. view will consider the impact of BSS use in this band on other services, including the recent primary allocation of the band 2500-2690 MHz to the mobile except aeronautical mobile service.

[73] ***See Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Services,*** ET Docket No. 00-258, ***First Report and Order and Memorandum Opinion and Order,*** 16 FCC Rcd 17222 (2001) ***("New Advanced Wireless Services First R&O and MO&O")***.

[74] ***Id.*** at ¶ 26.

[75] ***Id.*** at ¶ 12.

[76] In December 1990, OET and the Private Radio Bureau granted a waiver so that three companies could use these frequencies for private operational fixed microwave service distribution of video and audio entertainment. At that time, the applicants stated "that the most recent [FSS] application for the use of these frequencies was tiled more

request comment on these proposals?'

E. Space Science Services

53. The space science services include the EESS, SRS, METSAT, and space operation services. These services are used to measure phenomena that can impact the Earth's habitat and its environmental quality, provide weather forecasts, and explore the planets. Human space flight includes development of the international space station with participation of a number of countries. Active and passive spaceborne microwave sensors are tools that provide environmental data on a repetitive and global scale with an ability to penetrate clouds to obtain measurements unavailable by other means. In addition to using spectrum for active and passive sensing from space, the space science services use spectrum for command, tracking, data acquisition, and communications with satellites.

1. Active Spaceborne Sensors

a. Current Allocations and U.S. WRC-97 Proposals

54. Active spaceborne sensors transmit signals that are reflected by and therefore convey useful scientific information about land, ocean, and atmospheric surfaces.[78] Prior to WRC-97, many spaceborne sensor allocations were on a secondary basis in international footnotes 5.333 and 5.551, which the Commission had adopted domestically. In its preparation for WRC-97, the United States found that secondary allocations were inadequate to provide the long-term stability and protection needed to assure the availability of the data that these sensors provide. At WRC-97, the United States proposed that existing allocations for active spaceborne sensors be changed from secondary footnote status to primary direct Table listings in seven frequency bands: 1215-1300 MHz, 3100-3300 MHz, 5250-5350 MHz, 8550-8650 MHz, 9500-9800 MHz, 13.4-13.75 GHz, and 35.5-35.6 GHz. In addition, the U.S. proposed to extend the active spaceborne sensor allocation in the band 13.4-13.75 GHz down in frequency to include the band 13.25-13.4 GHz, to upgrade the secondary direct Table allocations for EESS (active) and SRS (active) in the band 17.2-17.3 GHz to primary status, and to allocate the band 35.6-36 GHz to the EESS (active) and SRS (active) on a primary basis. The 1997 Conference Preparatory Meeting ("CPM-97") concluded that active sensors and current primary services are compatible in all of these bands, except for the band 3100-3300 MHz where no definitive finding was possible. Therefore, the U.S. proposed regulatory provisions to ensure that radar operations are not compromised in the event that they cause interference to the sensors in the band 3100-3300 MHz. In view of the importance of the radiolocation and **RNSS** operations in the band 1215-1300 MHz, the U.S. also proposed similar regulatory provisions in that band. Finally, the United States supported a Canadian WRC-97 proposal to allocate the band 5350-5460 MHz to the EESS (active) on a primary basis. In the paragraphs below, we discuss the current U.S. allocations and U.S. WRC-97 proposals in more detail.

55. 1215-1300 MHz. The band 1215-1240 MHz is a Federal Government exclusive band that is allocated to the radiolocation service and for RNSS downlinks on a co-primary basis.[79] The band

than 10 years ago, and that **all** such applications have been abandoned because the band is too limited **for** current Fixed-Satellite Service purposes."

[77] **As a** ministerial matter, we would delete footnotes **5.409** and **5.411** from the non-Federal Government Table in the band 2500-2655 **MHz** because footnote US205 prohibits tropospheric scatter systems in the band 2500-2690 **MHz** and thus these international footnotes are superfluous.

[78] ***See United States Proposals for the Work of the Conference,*** Document **30-E,** dated September 4, 1997 (*"U.S. WRC-97 **Proposals**").*

[79] ***See*** ¶ **42,** ***supra,*** for the RNSS (space-to-space) allocation proposal in this band

1240-1300 MHz is a Federal and non-Federal Government shared band that is allocated to the radiolocation service on a primary basis for Federal Government use, to the ARNS for Federal and non-Federal Government use on a primary basis,[80] and to the amateur service on a secondary basis for non-Federal Government use. Radiolocation stations installed on spacecraft are authorized by footnote 5.333 to be employed for the EESS and SRS services on a secondary basis in the band 1215-1300 MHz.

56. The band 1215-1300 MHz is one of the frequency bands currently used to obtain "multi-spectral images" through use of active spaceborne sensors operating under footnote 5.333.8' These images are used to study the Earths ecosystems, climate and geological processes, the hydrologic cycle and ocean circulation. The band 1215-1300 MHz has been used by spaceborne synthetic aperture radars beginning in 1978 and continuing up to the present with the space shuttle imaging radar and other systems. Studies conducted in the ITU-R, coupled with operational experience gained over a period of 20 years, demonstrate that active spaceborne sensors, radiolocation, and RNSS are compatible in this band. Therefore, the United States proposed that the secondary EESS and SRS allocations in the band 1215-1300 MHz in footnote 5.333 be raised to primary status, be shown as direct Table allocations, and be designated for active spaceborne sensor use. However, in view of the importance of the radiolocation and RNSS operations in this band, the U.S. proposed that international footnote 5.332 be adopted, which requires that active spaceborne sensors not cause interference to, claim protection from, or otherwise impose constraints on the operation or development of the radiolocation service, RNSS, or ARNS.[82]

57. 3100-3300 MHz. The band 3100-3300 MHz is a Federal and non-Federal Government shared band that is allocated to the radiolocation service on a primary basis for Federal Government use and on a secondary basis for non-Federal Government use. Radiolocation stations installed on spacecraft are authorized by footnote 5.333 to be employed for the EESS and SRS services on a secondary basis in the band 3100-3300 MHz.

58. The band 3100-3300 MHz is also used to obtain multi-spectral images through the use of active spaceborne sensors operating under footnote 5.333. While studies conducted in the ITU-R demonstrate that spaceborne sensors will not cause harmful interference to land and airborne radiolocation systems, it was not possible to conclude that there would be compatibility between shipbome radars and spaceborne sensors.[83] Therefore, the U.S. proposed that the secondary EESS and SRS allocations in the band 3100-3300 MHz in footnote 5.333 be raised to primary status, be shown as direct Table allocations, and be designated for active spaceborne sensor use. However, in making this proposal, the U.S. stated that active spaceborne sensors could only be given primary allocation status if an international footnote was adopted to insure that radar operations are not compromised in the event that they cause interference to the sensors.[84]

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[80] See 47 C.F.R. § 2.106, footnote 5.334

[81] A multi-spectral image is a collection of several monochrome images of the same scene, each of them taken with a different sensor. A well known multi-spectral image is an "RGB" color image, consisting of a red, green, and blue image, each of them taken with a sensor sensitive to a different wavelength. In image processing, multi-spectral images are most commonly used for remote sensing applications. Satellites usually take several images from frequency hands in the visual and non-visual range. For example, Landsat 5 produces seven images with the wavelength of the hands being between 450 and 1250 nm. For more information, see http://www.dai.ed.ac.uk/HIPR2/mulimage.htm.

[82] *See U.S. WRC-97 Proposals* at 104.

[83] *See U.S. WRC-97 Proposals* at 107.

[84] Id.

59. 5250-5350 MHz, 8550-8650 MHz, 9500-9800 MHz, and 17.2-17.3 GHz. The bands 5250-5350 MHz, 8550-8650 MHz, 9500-9800 MHz, and 17.2-17.3 GHz are Federal and non-Federal Government shared bands that are allocated to the radiolocation service on a primary basis for Federal Government use and on a secondary basis for non-Federal Government use. Radiolocation stations installed on spacecraft are authorized by footnote 5.333 to be employed for the EESS and SRS services on a secondary basis in the bands 5250-5350 MHz, 8550-8650 MHz, and 9500-9800 MHz. The band 17.2-17.3 GHz is **also** allocated to the EESS (active) and SRS (active) on a secondary basis for Federal and non-Federal Government use. In January 1997, we made the band 5250-5350 MHz available for Unlicensed National Information Infrastructure ("U-NII") devices?' In June 1998, we affirmed the U-NII power level and antenna gain limits adopted for the band 5250-5350 MHz.[86]

60. The bands 5250-5350 MHz, 8550-8650 MHz, 9500-9800 MHz, and 17.2-17.3 GHz are currently used to obtain multi-spectral images through use of active spaceborne sensors operating under footnote 5.333. The images obtained at 5250-5350 MHz and 9500-9800 MHz are used to study the Earths ecosystems, climate and geological processes, the hydrologic cycle and ocean circulation. Altimeter measurements in the band 5250-5350 MHz provide data to study Ocean dynamics and their effects on climatology and meteorology. Spaceborne scatterometer measurements of ocean surface wind speeds and directions in the band 9500-9800 MHz play a key role in understanding and predicting global weather patterns and climate systems. Studies conducted in the ITU-R demonstrate that active sensors and the radiolocation service are compatible in these bands. Therefore, the United States proposed that the secondary EESS and **SRS** allocations in the bands 5250-5350 MHz, 8550-8650 MHz, and 9500-9800 MHz in footnote 5.333 be raised to primary status, be shown as direct Table allocations, and be designated for active spaceborne sensor use. The U.S. also proposed that the secondary direct Table allocations for EESS and SRS in the band 17.2-17.3 GHz be raised to primary status and be designated for active spaceborne sensor use.[87]

61. 5350-5460 MHz. The band 5350-5460 MHz is a Federal and non-Federal Government shared band that is allocated to ARNS on a primary basis for Federal and non-Federal Government use and to the radiolocation service, with Federal Government use on a primary basis and with non-Federal Government use on a secondary basis. Footnote 5.449 states that ARNS use of the band 5350-5470 MHz is limited to airborne radars and associated airborne beacons.

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[85] ***See Amendment of the Commission's Rules to Provide for Unlicensed NII/SUPERNet Operations in the 5 GHz Frequency Range,*** ET Docket No. 96-102, ***Report and Order,*** 12 FCC Rcd 1576 (1997) (***"U-NII Repon and Order").*** These devices will provide short-range, high speed wireless digital communications on an unlicensed basis. We anticipate that U-NII devices will support the creation of new wireless local area networks and will facilitate wireless access to the National Information Infrastructure ("NII"). NII is a group of networks, including the public switched telecommunications network, radio and television network. private communications networks, and other networks not yet built, which together will serve communications and information processing needs.

[86] ***See Amendment of the Commission's Rule to Provide for Operation of Unlicensed NII/SUPERNet Devices in the 5 GHz Frequency Range,*** ET Docket No. 96-102, ***Memorandum Opinion and Order,*** 13 FCC Rcd 14355 (1998). In its comments to Petitions for Reconsideration in the U-NII proceeding, NTIA stated that it supports the power level and antenna gain limits adopted by the Commission in the ***U-NII Reporr and Order. See*** NTIA Comments on Petitions for Reconsideration in ET Docket No. 96-102, dated April 18, 1997, at **15.** We affirmed these limits in the ***U-NII Memorandum Opinion and Order.***

[87] ***See U.S. WRC-97 Proposals*** at 111, 112, and 117 **for** the proposals dealing with the bands 8500-8750 MHz, 9500-9800 MHz, and 17.2-17.3 GHz, respectively. For the band 5250-5350 MHz, the U.S. **proposal** is included as a joint proposals made by several nations of the Inter-American Telecommunications Commission ("CITEL"). ***See*** CITEL Administrations Proposals for **the** Work of the Conference, Document 40-E, dated September 12, 1997, at agenda item 1.9.2.

62. While the band 5350-5460 MHz is not currently allocated to the EESS (active) in the United States, the European Space Agency uses this allocation on its JASON spacecraft. The National Aeronautics and Space Administration ("NASA") benefits from the EESS (active) allocation by receiving information from the JASON spacecraft in the 8025-8400 MHz EESS downlink band. NASA wishes to have the EESS (active) allocation implemented in the United States for future uses.

63. 13.25-13.75 GHz and 35.5-36 GHz. The band 13.25-13.4 GHz is a Federal and non-Federal Government shared band that is allocated to ARNS on a primary basis and to SRS uplinks on a secondary basis. Footnote 5.497 states that *ARNS* **use** of the band 13.25-13.4 GHz is limited to Doppler navigation aids. The bands 13.4-13.75 GHz and 35.5-36 GHz are Federal and non-Federal Government shared bands that are allocated to the radiolocation service on a primary basis for Federal Government use and on a secondary basis for non-Federal Government use. Radiolocation stations installed on spacecraft are authorized by footnote 5.333 to be employed for the EESS and SRS services on a secondary basis in the band 13.4-13.75 GHz. Radars located on spacecraft are authorized by footnote 5.551 to operate on a primary basis in the band 35.5-35.6 GHz.

64. Federal agencies have **long** operated active spaceborne sensors in the band 13.4-14 GHz as authorized by footnote 5.333. For example, the band 13.4-14 GHz is used by active spaceborne **sensors** to measure tropical rainfall. Altimeter measurements in the band 13.4-14 GHz provide data to study ocean dynamics and their effects on climatology and meteorology. Spaceborne scatterometer measurements of ocean surface wind speeds and directions in the band 13.25-14 GHz play a key role in understanding and predicting global weather patterns and climate systems.

65. At WRC-97, the United States proposed to shift the active spaceborne sensor allocation at 13.4-14 GHz down to 13.25-13.75 GHz.[88] Active sensors have long used the 13.4-14 GHz band for these measurements; however, the band 13.75-14 GHz is no longer viable for this purpose due to its allocation at WARC-92 to the FSS (Earth-to-space). The necessary bandwidth can be restored by converting the SRS uplink allocation in the 13.25-13.4 GHz band, which was authorized in footnote 5.498, to one for use by active spaceborne sensors. Studies conducted in the ITU-R have determined that active spaceborne sensors and *ARNS* are compatible in the band 13.25-13.4 GHz. These studies have also confirmed that active sensors and the radiolocation service are compatible in the band 13.4-13.75 GHz.

66. Precise altimetry using active spaceborne sensors requires measurements at two separate frequencies in order to compensate for measurement inaccuracies introduced by propagation through the atmosphere. Studies conducted in the ITU-R confirm that a bandwidth of 500 megahertz for active **sensors** in each of these bands is necessary and sufficient to meet the long-term requirements for wideband altimetry. Therefore, the United States proposed to allocate the bands 13.25-13.75 GHz and 35.5-36 GHz for active spaceborne sensors.[89] The U.S. also proposed to permit passive SRS uses in the band 13.4-13.7 GHz on a secondary basis.

b. WRC-97 Results

67. At WRC-97, the U.S. proposals for active spaceborne sensors were adopted, except that active sensors in the band 3100-3300 MHz were not given a primary allocation status and the requirements to protect incumbent services in the band 13.25-13.75 GHz were strengthened.[90] Specifically, WRC-97 adopted footnotes 5.498A and 5.501B, which require that active sensors not cause

[88] *See U.S. WRC-97 Proposals* at 110-112.

[89] *See U.S. WRC-97 Proposals* at 114-117 and 120-121.

[90] See *WRC-97 Final Acts* at 37, 39, 40, 43-44, 49, 50-51, 54-55

harmful interference to, or constrain the use or development of, ARNS in the band 13.25-13.4 GHz and the radiolocation service in the band 13.4-13.75 GHz, respectively. In addition, the U.S. supponed a Canadian proposal to allocate the band 5350-5460 MHz to the EESS (active), which WRC-97 subsequently adopted?' This EESS (active) allocation is limited by footnote 5.448A, wherein EESS (active) operations in the band 5350-5460 MHz must not cause harmful interference to, nor constrain the future development and deployment of, the radiolocation service.

c. Proposals

68. We observe that Federal agencies, such as NASA and the National Oceanic and Atmospheric Administration ("NOAA"), are the main users of active spaceborne sensor allocations. We also observe that there are only secondary non-Federal Government allocations in the frequency bands that WRC-97 allocated for active spaceborne sensor operations, except for the primary ARNS allocations in the bands 5350-5460 MHz and 13.25-13.4 GHz. As such, NTIA has requested that the primary active spaceborne sensor allocations made at WRC-97 be added to the Federal Government Table on a primary basis and that these allocations be added to the non-Federal Government Table of Frequency Allocations ("non-Federal Government Table") on a secondary basis?'

69. We propose to allocate the bands 1215-1300 MHz, 3100-3300 MHz, 5255-5350 MHz,[93] 8550-8650 MHz, 9500-9800 MHz, 13.25-13.4 GHz, 17.2-17.3 GHz, and 35.5-36 GHz to the EESS (active) and SRS (active); the bands 5250-5255 MHz and 13.4-13.75 GHz to the EESS (active) and SRS; and the band 5350-5460 MHz to the EESS (active). In the Federal Government Table, we propose that all of these active spaceborne sensor allocations would have primary status, except in the band 3100-3300 MHz, where the sensors would continue to have secondary status.[94] In the non-Federal Government Table, all of these allocations are proposed to have secondary status. We tentatively find that these allocations will substantially improve our nation's ability to make long-term environmental measurements with active spaceborne sensors.

70. NTIA also recommends the adoption of several international footnotes in the frequency bands where primary active spaceborne sensor allocations are proposed for Federal Government use. Specifically, NTIA recommends the adoption of footnotes 5.332, 5.335, 5.448B, 5.498A, and 5.501B, which state that active spaceborne sensors must not cause harmful interference to, or constrain the use and development of, incumbent primary services in the bands 1215-1300 MHz, 5350-5460 MHz, and 13.25-13.75 GHz. NTIA also recommends the adoption of footnotes 5.447D and 5.501A, which state that the primary SRS allocations in the bands 5250-5255 MHz and 13.4-13.75 GHz are limited to active spaceborne sensors and that other space research uses are on a secondary basis.

71. As a consequence of these proposals, footnotes 5.333 and 5.551, which provide the current secondary active spaceborne sensor allocations, would be deleted from the U.S. Table. Also, the

[91] *See WRC-97 Final Acts* at 39 and 40

[92] See 47 C.F.R. § 2.106, column 5 of the Table of Frequency Allocations.

[93] The Commission and NTIA are working on a United States position regarding WRC-03 agenda item 1.5. Specifically, WRC-03 will, *inter alia,* consider an allocation of frequencies to the mobile service in the band 5150-5350 MHz for the implementation of wireless access systems including radio local area networks ("RLANs"). See ITU Council, 2000 Session, Resolution 1156 (Agenda for WRC-03), agenda item 1.5, Document C2000/88-E, dated July 26, 2000; and *WRC-2000 Final Acts,* Resolution 736. The United States is weighing all interests and is working toward an equitable solution.

[94] See 47 C.F.R. § 2.106, column 4 of the Table of Frequency Allocations

secondary allocation for the SRS (Earth-to-space) in the band 13.25-13.4 GHz would be deleted. We request comment on all of the above proposals, which are summarized below.

Table 2: Active Spaceborne Sensor Allocation Proposals
(Allocations primary unless ott wise specified)

Federal Government Table		non-Federal Government Table		Summary of Maior Changes
Current	Proposed	Current	Proposed	
1215-1240 MHz RADIOLOCATION 5.333 (stations on spacecraft may be used for secondary EESS & SRS) G56 (primarily for use by military) RNSS (downlinks)	1215-1240 MHz RADIOLOCATION G56 RNSS (downlinks) (space-to-space) EESS (active) SRS (active) 5.332 (active sensors may not interfere with radiolocation or RNSS)	1215-1240 MHz 5.333	1215-1240 MHz Secondary EESS (activn) Secondary SRS (active)	Raise 85 MHz of secondary EESS & SRS spectrum to primary status for Federal Government use. Additional directional indicator for RNSS for Federal Government use.
1240-1300 MHz RADIOLOCATION G56 5.334 (band allocated to ARNS on primary basis)	1240-1300 MHz RADIOLOCATION G56 EESS (active) SRS (active) 5.332 5.334 5.335 (active sensors may not interfere with ARNS)	1240-1300 MHz secondary amateur 5.282 (AMSAT uplinks may operate in 1260-1270 MHz) 5.333 5.334	1240-1300 MHz Secondary amateur Secondary EESS (activn) Secondary SRS (active) 5.282 5.334	
3100-3300 MHz RADIOLOCATION 5.333 US110 G59 5.149	3100-3300 MHz RADIOLOCATION G59 Secondary EESS (active) Secondary SRS (active) US342	3100-3300 MHz Secondary radiolocaiion 5.333 US110 5.149	3100-3300 MHz Secondary radiolocation Secondary EESS (active) Secondary SRS (active) US342	Convert 200 MHz of secondary EESS & SRS spectrum from footnote allocation to direct Table listing.
5250-5350 MHz RADIOLOCATION 5.333 US110 G59	5250-5255 MHz RADIOLOCATION G59 EESS (active) SRS 5.447D factive: other uses secondary)	5250-5350 MHz Secondary radiolocation 5.333 US110 Available lor U-NII devices.	5250-5255 MHz Secondary radiolocation Secondary EESS (active) Secondary SRS Available for U-NII devices.	Raise 100 MHz of secondary EESS & SRS spectrum (footnote 5.333) to primary status for Federal Government use.
	5255-5350 MHz RADIOLOCATION G59 EESS (active) SRS (active)		5255-5350 MHz Secondary [illegible] Secondary [illegible]ESS (active) Secondary SRS (active) Available for U-NII devices.	Convert 100 MHz of secondary non-Gov't EESS & SRS spectrum from footnote allocation to direct Table listings.
5350-5460 MHz ARNS 5.449 (limited to airborn radars & beacons) RADIOLOCATION G56 US48	5350-5460 MHz ARNS 5.449 RADIOLOCATION G56 EESS (active) 5.448B	5350-5460 MHz ARNS 5.449 (limited to airborne radars &beacons) Secondary Radiolocation US48	5350-5460 MHz ARNS 5.449 Secondary [illegible] Secondary EESS ([illegible])	Additional 110 MHz for EESS (active), with Federal Government use on a primary basis & non-Federal Government use on a secondary basis.
8550-8650 MHz RADIOLOCATION 5.333 US110 G59	8550-8650 MHz RADIOLOCATION G59 EESS (active) SRS (active)	8550-8650 MHz Secondary radiolocation.. 5.333 US110	8550-8650 MHz Secondary radiolocation Secondary EESS (active) Secondary SRS (active)	Raise 100 MHz of secondary EESS & SRS spectrum to primary status for Federal Gov't use.
9500-9800 MHz RADIOLOCATION 5.333 US110	9500-9800 MHz RADIOLOCATION EESS (active) SRS (active)	9500-9800 MHz Secondary radiolocation 5.333 US110	9500-9800 MHz Secondary radiolocation Secondary EESS (active) Secondary SRS (active)	Raise 300 MHz of secondary EESS & SRS spectrum to primary status for Federal Gov't use.

Table 2 Continued: Acti Spaceborne Sensor Allocation Proposals
(Allocations are primary unless otherwise specified)

Federal Government Table		non-Federal Government Table		Summary of Maior Changes
Current	Proposed	Current	Proposed	
13.25-13.4 GHz ARNS 5.497 (limited to doppler navigation aids) Secondary SRS (uplinks)	13.25-13.4 GHz ARNS 5.497 EESS (active) SRS (active) 5.498A (active space-borne sensors may not cause harmful interference to ARNS)	13.25-13.4 GHz ARNS 5.497 Secondary SRS (uplinks)	13.25-13.4 GHz ARNS 5.497 Secondary **EESS** (active) Secondary SRS (active)	Additional 500 MHz for EESS (active), with primary status for Federal Government use & secondary status lor non-Federal Government use.
13.4-13.75 GHz RADIOLOCATION 5.333 US110 G59 Secondaly SRS Secondary Standard frequency & time signal-satellitf (uplinks) ("SF&TS (uplinks")	13.4-13.75 GHz RADIOLOCATION G59 EESS (active) SRS 5.501A (active: other uses secondary) Secondary SFBTS (uplinks) 5.501 B (active space-borne sensors may not cause harmful interference to radiolocation)	13.4-13.75 GHz Siecondary radiolocation 5.333 US110 Secondary SRS Secondary SF&TS (uplinks)	13.4-13.75 GHz Secondary radiolocation Secondary EESS (active) Secondary SRS Secondary SF&TS (uplinks)	Raise 500 MHz of secondary SRS spectrum to primary status lor Federal Government use.
17.2-17.3 GHz RADIOLOCATION US110 G59 Secondary EESS (active) Secondary SRS (active)	17.2-17.3 GHz RADIOLOCATION EESS (active) SRS (active)	17.2-17.3 GHz Secondary radiolocation US110 (band proposed for deletion from US110 in NPRM) Secondary EESS (active) Secondary SRS (active)		Raise 100 MHz 01 secondary EESS (active) & SRS (active) to primary status for Federal Government use.
35.5-36 GHz RADIOLOCATION US110 G34 (all nonmilitary radiolocation is secondary to military) 5.551 (radars located on spacecraft may be operated on a primary basis in the band 35.5-35.6 GHz) US360 (33-36 GHz is allocated to the Gov't FSS on a primary basis) G117 (Gov't FSS is limited to military)	35.5-36 GHz RADIOLOCATION EESS (active) SRS (active) US360 G117	35.5-36 GHz Secondaly radiolocation US110 5.551 US360	35.5-36 GHz Secondary radiolocation Secondary EESS (active) Secondary SRS (active) US360	Additional 400 MHz lor EESS (active) *8* SRS (active), with Gov't use on primaly basis & non-Gov't use on secondary basis; convert footnote allocation for radar use in 100 MHz (footnote 5.551) to EESS & SRS direct Table listing for Gov't use; downgrade primary status (as provided for in footnote 5.551) to secondary lor non-Government use in 100 MHz.

2. EESS Uplink and METSAT Uplink Allocations in the Band 401-403 MHz

72. In the United States, the band 401-403 MHz is Federal and non-Federal Government shared spectrum that is allocated to the meteorological aids service (radiosonde)[95] on a primary basis and

[95] A radiosonde is an automatic radio transmitter in the meteorological aids service usually carried on an aircraft, free balloon, kite, or parachute, and which transmits meteorological data. See 47 C.F.R. § 2.1.

to EESS uplinks and METSAT uplinks on a secondary basis. Frequencies in the band 401403 MHz are, ***inter alia,*** used by airborne, land-based, and maritime data collection platforms for reporting to satellites. The sub-band 401402 MHz is also allocated to the space operations service on a primary basis.

73. At WRC-97, the secondary EESS and METSAT uplink allocations in the band 401403 MHz were upgraded to primary status.% This action addressed some of the shortfall in telecommand uplink spectrum compared to available downlink spectrum in the frequency range from 100 MHz to 1 GHz. Prior to WRC-97's action, international downlink allocations equaled 14.45 megahertz, while international uplink allocations equaled only 2.4 megahertz. NTIA requests that the secondary EESS uplink and METSAT uplink allocations in the band 401403 MHz be upgraded to primary status in the Federal Government Table.[97] NTIA also recommends that we adopt the following United States footnote:

> USxxx In the band 401-403 MHz, the non-Federal Government Earth exploration-satellite (Earth-to-space) and meteorological-satellite (Earth-to-space) services are limited to earth stations transmitting to Federal Government space stations.

74. We believe that in order for continuous reliable observations to be made, it is essential that data transmitted in the band 401-403 MHz not receive harmful interference.[98] Accordingly, we propose to upgrade the secondary EESS and METSAT allocations in the band 401403 MHz to primary status for Federal Government use and to limit non-Federal Government use of these allocations to earth stations transmitting to Federal Government space stations. We request comment on these proposals, and in particular on whether we should limit non-Federal Government use of these allocations to earth stations transmitting to Federal Government space stations.

3. EVA Communications at 410-420 MHz

75. The band 410-420 MHz is Federal Government exclusive spectrum that is allocated to the fixed and mobile services on a primary basis in the Commission's Table of Frequency Allocations.[99] At WARC-92, the United States proposed that the band 410420 MHz be allocated to the SRS (space-to-space) on a primary basis, accompanied by a suitable footnote to ensure that the allocation would not result in constraints on the operation of fixed and mobile systems.[100] The purpose of this proposal was to provide a primary allocation in an appropriate service for communications during scheduled extra-vehicular activities ("EVA).'" Instead, WARC-92 allocated the band 410-420 MHz to the SRS (space-

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% ***See WRC-97 Final Acts*** at ***18.***

[97] ***See*** Letter from Acting Associate Administrator, Office of Spectrum Management, NTIA, to Chief, OET, FCC, dated January 6, 2000 ("'January2000 NTIA Letter") at 2, 8.

[98] ***See WARC-92 Final Acts*** at 245 (Resolution No. 710).

[99] For the specific purpose of transmitting hydrological and meteorological data in cooperation with Federal agencies, four frequencies in the band 410-420 MHz may be authorized to non-Federal Government fixed stations on the condition that harmful interference will not be caused to Federal Government stations. ***See*** 47 C.F.R. § 2.106, footnote US13.

[100] This U.S. proposed footnote would have limited the use of the SRS allocation to communications within 5 kilometers of an orbiting, manned space vehicle and would have required that the SRS allocation not cause harmful interference to the fixed and mobile services. ***See An Inquiry Relating to Preparation for the International Telecommunication Union World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum,*** Gen. Docket No. 89-554, ***Second Notice of Inquiry,*** 5 FCC Rcd 6062 (1990); ***Report,*** 6 FCC Rcd 3930-3931 (1991).

[101] EVA is described as work activities undertaken by astronauts outside the shelter of their base space vehicle, protected only by a life support space suit.

to-space) on a secondary basis. WARC-92 also adopted footnote 651A, which limited the use of the SRS to communications within 5 km of an orbiting, manned space vehicle.[102] In 1993, NTIA modified its *Manual* to add this secondary SRS allocation and footnote 651A to the Federal Government Table in the band 410-420 MHz.[103]

76. At WRC-97, the United States proposed to upgrade this secondary SRS allocation to primary status, accompanied by a suitable footnote, which later was numbered 5.268, to ensure that the allocation would not result in constraints on the operation of fixed and mobile systems.[104] WRC-97 made the requested allocation changes.[105] In its recommendations for WRC-97 implementation, NTIA requests that we revise the Federal Government Table in our Rules to incorporate these allocation changes.[106] Accordingly, we propose to allocate the band 410-420 MHz to the SRS (space-to-space) on a primary basis for Federal Government use and to limit its use through the adoption of footnote 5.268. This SRS allocation will permit the EVA system to provide communication among astronauts and their base spacecraft while those astronauts are performing activities outside the base spacecraft, *e.g.*, construction, assembly, inspection, and maintenance.[107] We observe that the "operating range for an EVA communication link would normally be confined to within about 100 meters of the primary spacecraft, though reliable operation at distances not to exceed 5 km is required to support contingency operations."[108]

4. METSAT NGSO Downlinks at 7750-7850 MHz

77. The band 7750-7850 MHz is Federal Government exclusive spectrum that is allocated to the fixed service on a primary basis. At WRC-97, the band 7750-7850 MHz was allocated to the METSAT (space-to-Earth) on a primary basis, and, through the adoption of footnote 5.5461B, limited to non-geostationary satellite orbit ("NGSO) systems.[109] NTIA requests that the band 7750-7850 MHz be

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[102] *See WARC-92 Final* Acrs at 40.

[103] See Memorandum from Chairman, IRAC, to Executive Secretary, IRAC, dated February 2, 1993. See *also* note *2, supra.*

[104] *See* CITEL Administrations Proposals for the Work of the Conference, Document 40-E, dated September 12. 1997. CITEL stands for the Inter-American Telecommunications Commission. Specifically, Argentina, Brazil, Canada, the United States, and Uruguay jointly formulated this proposal.

[105] *See WRC-97 Find Acts* at pp. 18-19. Footnote 5.268 reads as follows: "Use of the band 410-420 MHz by the space research service is limited to communications within 5 km of an orbiting, manned space vehicle. The power flux-density at the surface of the Earth produced by emissions from extra-vehicular activities shall not exceed -153 dB(W/m^2) for 0" ≤ 6 ≤ 5°, -153 + 0.077 (6 - 5) dB(W/m^2) for 5° ≤ 6 ≤ 70" and -148 dB(W/m^2) for 70° ≤ 6 ≤ 90°, where 6 is the angle of arrival of the radio-frequency wave and the reference bandwidth is 4 kHz. No. S4.10 does not apply to extra-vehicular activities. In this frequency band the space research (space-to-space) service shall not claim protection from, nor constrain the use and development of, stations of the fixed and mobile services."

[106] See January 2000 NTIA Letter at 9.

[107] *See* note 7, supra, at "Proposal for agenda item 1.9.5 - Allocation to the space research service (space-to-space) near 400 MHz."

[108] *Id.*

[109] *See WRC-97 Final* Acts at 41-42

allocated for METSAT downlinks in the Federal Government Table, limited to NGSO satellites.[110] Accordingly, we propose to adopt the requested METSAT allocation.

5. Deep Space Communications

78. NASA uses its Deep Space Network ("DSN") for radio communications with interplanetary spacecraft. In the U. S., NASA's deep-space communications facility is at Goldstone, in California's Mojave Desert."[111] As a spacecraft travels outward from Earth, the received signal steadily decreases in power so that by the time it reaches Earth from an outer planet encounter, it can be an extremely weak signal, *e.g.*, 20 billion times weaker than the power required for a digital wristwatch, or about 1,000 billion times weaker than the signal received by a TV set.

a. Deep Space Downlinks at 8400-8450 MHz

79. The band 8400-8450 MHz is Federal Government exclusive spectrum that is allocated to the fixed service and the SRS (space-to-Earth) (deep space) on a co-primary basis. NTIA recommends that the band 8400-8450 MHz be allocated to the non-Federal Government SRS on a secondary basis, limited to the reception of transmissions from deep space."[112] Accordingly, we propose to allocate the band 8400-8450 MHz to the SRS (space-to-Earth) (deep space) on a secondary basis for non-Federal Government use. This allocation will allow non-Federal Government entities, such as educational institutions, to perform scientific research in cooperation with NASA.

b. Protection for Deep Space Reception at 31.8-32.3 GHz

80. The band 31.8-32.3 GHz is allocated to the SRS (deep space) (space-to-Earth) on a primary basis for Federal and non-Federal Government use, limited to NASA's deep space facility at Goldstone, California.[113] In addition, the sub-band 31.8-32 GHz is allocated to the radionavigation service on a primary basis for Federal Government use. The sub-band 32-32.3 GHz is also allocated to the ISS on a primary basis for Federal and non-Federal Government use.

81. In order to protect the Goldstone facility from potential interference, NTIA has deleted the ISS allocation in the band 32-32.3 GHz from the Federal Government Table and requests that we also delete this ISS allocation from the non-Federal Government Table.[114] NTIA submits that ITU-R Recommendation SA.1016 clearly documents that deep space reception cannot share spectrum with ISS operations. NTIA states that signals received on Earth from spacecraft in deep space are extremely weak and are highly susceptible to interference of all kinds. In particular, it indicates that the presence of near-

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[110] *See* January 2000 NTIA Letter at 22.

[111] The DSN is an international network of antennas that supports interplanetary spacecraft missions and radio and radar astronomy observations for the exploration of the solar system and the universe. The network also supports selected Earth-orbiting missions. The DSN consists of three deep-space communications facilities placed approximately 120 degrees apart around the world: at Goldstone; near Madrid, Spain; and near Canberra, Australia. This strategic placement permits constant observation of spacecraft as the Earth rotates, and helps to make the DSN the largest and most sensitive scientific telecommunications system in the world. For more information, see http://deepspace.jpl.nasa.gov/dsnmrochure/index.html.

[112] *See* NTIA RNSS Letter.

[113] The Goldstone site limitation is codified in footnote US262.

[114] See Letter from Associate Administrator for Spectrum Management, NTIA, U.S. Department of Commerce, to Acting Chief, OET, FCC, dated April 6,2001.

Earth spaceborne interference sources easily overwhelms the desired signals from deep space. Large space research earth station antennas, equipped with cryogenic preamplifiers and specialized receivers, are required to successfully communicate with spacecraft operating in deep space regions. These earth stations are **usually** sited to provide shielding from potentially interfering terrestrial sources. However, NTIA observes that such isolation is not possible in the case of orbiting spacecraft sharing the same frequency band with deep space operations.

82. To satisfy present and future scientific data return requirements, NASA is placing heavy reliance on space-to-Earth links in the band 31.8-32.3 GHz.[115] Currently, NASA has three operational spacecraft using the 32 GHz band.[116] The space agencies of other administrations are also studying the use of the 32 GHz band for those missions requiring wider bandwidth than is achievable in the 2 GHz or 8 GHz bands. We have reviewed **our** licensing files and the **ISS** allocation in the band 32-32.3 GHz is unused. Accordingly, we propose to delete the ISS allocation from the band 32-32.3 GHz in order to protect deep space reception at Goldstone, California.

83. In its WRC-2003 proposals, the United States anticipates proposing that the ISS allocation from 32-33 GHz be modified to exclude the band 32-32.3 GHz, stating that sharing with deep space downlinks does not appear feasible.[117] Until such time as this ISS allocation has been removed internationally, we believe that it is necessary to move the text of footnote 5.548 into a United States footnote. The text **of** the proposed United States footnote is the same as footnote 5.548, except for the deletion of the band 32-32.3 GHz. The proposed United States footnote would read ***as*** follows:

> USzzz In designing systems for the inter-satellite service in the band 32.3-33 GHz, for the radionavigation service in the band 32-33 GHz, and for the space research service (deep space) (space-to-Earth) in the band 31.8-32.3 GHz, all necessary measures shall be taken to prevent harmful interference between these services, bearing in mind the safety aspects of the radionavigation service.

c. **Deep** Space **Uplinks** at **34.2-34.7** GHz

84. In the United States, the hand 33.4-36 GHz is allocated to the radiolocation service on a primary basis for Federal Government use and on **a** secondary basis **for** non-Federal Government use.[118] The band 33.4-36 GHz is also allocated for FSS downlinks on a primary basis for Federal Government use.[119] Footnote US252 states that the band 34.2-34.7 GHz is also allocated for SRS uplinks, limited to deep space communications at Goldstone, California.[120]

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[115] Improved performance for deep space links employing area-limited antennas accrue at frequencies higher than the traditional 2 GHz and 8 GHz space research downlink bands because of increased directivity. Propagation is also improved as a result of decreased effects of charged particles in the interplanetary regions. The improved link performance in this band enables increased data transmission rates, thus increasing the efficiency of deep space operations.

[116] Surfsat, the Mars Global Surveyor, and the large international Cassini spacecraft have data return links in the 32 GHz band.

[117] **See** United States Preliminary Views for WRC-03 (as of February 21, 2002, Agenda Item 1.12D, p. 21

[118] In ¶ 69, above, we proposed to allocate the band 35.5-36 GHz to the **EESS** (active) and SRS (active).

[119] **See** 47 C.F.R. § 2.106, footnote US360.

[120] Currently footnote US252 reads **as** follows: "The bands 2110-2120 and 7145-7190 MHz, and 34.2-34.7 GHz are **also** allocated for Earth-to-space transmissions in the space research service, limited to deep space communications at Goldstone, California."

85. At WRC-95, the band 34.2-34.7 GHz was allocated to the SRS (deep space) (Earth-to-space) on a primary basis.[121] NTIA requests that the SRS deep space uplink allocation in footnote US252 be changed to a direct Table entry on a primary basis in the Federal Government Table and a secondary basis in the non-Federal Government Table.[122]

86. Accordingly, we propose to move the SRS (deep space) (Earth-to-space) allocation at 34.2-34.7 GHz from footnote US252 into the U.S. Table as a direct Table allocation, with Federal Government use on a primary basis and with non-Federal Government use on a secondary basis. We observe that NASA uses the band 34.2-34.7 GHz in conjunction with the band 31.8-32.3 GHz, which is allocated by footnote US262 for SRS downlinks, limited to deep space communications at Goldstone.[123] Therefore, we propose to move the Goldstone site restriction for the band 34.2-34.7 GHz from footnote US252 to footnote US262, which would read as follows:

> US262 The use of the band 31.8-32.3 GHz by the space research service (deep space) (space-to-Earth) and of the band 34.2-34.7 GHz by the space research service (deep space) (Earth-to-space) are limited to Goldstone, California.

F. The Band 25.25-27.5 GHz

87. At WARC-92, the United States proposed a primary ISS allocation in the band 25.25-27.5 GHz. The objective of this proposal was to provide a primary allocation for wide-bandwidth space-to-space data return links from low-orbiting user spacecraft to geostationary data relay satellites, *e.g.*, TRDSS.[124] In addition, the United States stated that this ISS allocation would be used to provide for wideband space-to-space links between permanent space stations and a variety of co-orbiting space vehicles in close proximity to such stations.[125]

88. WARC-92 adopted this ISS allocation and, through the adoption of footnote 881A, limited its use to SRS and EESS applications, as well as transmissions of data from industrial and medical activities in space.[126] With regard to the secondary allocation for the EESS (space-to-space) in the band 25.25-27.5 GHz, WARC-92 changed the directional indicator to (space-to-Earth) in the sub-band 25.5-27 GHz and deleted the remainder of the EESS allocation (25.25-25.5 GHz and 27-27.5 GHz).

89. In the United States, the band 25.25-27.5 GHz is used primarily by the Federal Government. Specifically, in the Federal Government Table, the band 25.25-27.5 GHz is allocated to the

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[121] *See WRC-95 Final Acts* at 204.

[122] *See* Letter from Acting Associate Administrator, Office of Spectrum Management, NTIA, to Chief, OET, FCC, dated June 10, 1998. *See also* Correction Letter, dated September 24, 1998.

[123] Footnote US262 currently reads as follows: "The use of the band 31.8-32.3 GHz by the space research service (deep space) (space-to-Earth) is limited to Goldstone, California."

[124] The geostationary data relay satellite would transmit to the low-orbiting user spacecraft in the existing ISS band at 22.55-23.55 GHz

[125] These "proximity" links would operate in the sub-band 25.25-25.55 GHz for space station transmit and in the sub-band 27.1-27.5 GHz for "free flyer" transmit. *See* In *the Matter of An Inquiry Relating to Preparation for the International Telecommunication Union World Administrative, Radio Conference for Dealing with Frequency Allocations in Certain Parrs of rhe Spectrum,* Gen. Docket No. 89-554, *Second Norice of Inquiry,* 5 FCC Rcd 6067 (1990); *Reporr,* 6 FCC Rcd 3910 and 3955 (1991).

[126] *See* ITU *Find Acts of the World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (WARC-92), Malaga-Torremolinos, 1992* at 85-86.

fixed and mobile services on a co-primary basis and to the EESS (space-to-space) on a secondary basis, and the sub-band 25.25-27 GHz is allocated to the standard frequency and time signal-satellite service (Earth-to-space) on a secondary basis. In the non-Federal Government Table, the band 25.25-27.5 GHz is allocated to the EESS (space-to-space) and the sub-band 25.25-27 GHz is allocated to the standard frequency and time signal-satellite service (Earth-to-space), both on a secondary basis.

90. On May 14, 1996, **NTIA** notified the Commission that it had implemented the WARC-92 allocation changes in its *Manual*.[127] Specifically, NTIA added a primary ISS allocation to the band 25.25-27.5 GHz, limited the use of this **ISS** allocation through the adoption **of** international footnote 881A, changed the directional indicator for the secondary EESS (space-to-space) allocation to (space-to-Earth) in the sub-band 25.5-27 GHz, and deleted the remainder of this secondary EESS allocation (25.25-25.5 GHz and 27-27.5 GHz).

91. At WRC-97, the United States proposed to upgrade the secondary EESS (space-to-Earth) allocation in the band 25.25-27 GHz to primary status, stating that these downlinks of EESS data to Earth needed to be on a protected basis.[128] The United States stated that advanced technology EESS spacecraft will require wider bandwidths to download their data and that the band 25.5-27 GHz is suitable for this purpose.[129] WRC-97 upgraded the EESS (space-to-Earth) allocation as requested.[130] In its WRC-97 recommendations, **NTIA** proposed to change the status of the EESS allocation from secondary to primary status in the Federal Government Table.'"

92. There are currently no FCC licensees using the secondary EESS (space-to-space) allocation in the band 25.25-27.5 GHz. We believe that conforming the non-Federal Government Table to the ***WARC-92 Final Acts*** and thus aligning with the Federal Government Table will increase the utility of this band for future non-Federal Government **use.** We anticipate that the EESS (space-to-Earth) allocation would he used for data downlinking from non-Federal Government remote sensing satellite systems. Moreover, we believe that **the** upgrade of the EESS allocation in the hand 25.5-27 GHz to primary status will provide Federal agencies with a reliable wideband data transfer capability for future EESS requirements, and that intensive Federal Government use of this band may lower equipment cost **for** non-Federal Government entities. Accordingly, we propose to: (1) reflect the changes previously made to the Federal Government Table in the *NTIA **Manual,*** except that footnote 881A **is** updated to *5.536;* (2) upgrade the EESS (space-to–Earth) allocation to primary status in the Federal Government Table; **(3)** change the directional indicator for the secondary EESS (space-to-space) allocation in the non-Federal Government Table to (space-to-Earth) in the sub-band 25.5-27 GHz; and (4) delete the remainder **of** this secondary EESS allocation (25.25-25.5 GHz and 27-27.5 GHz). We request comment on all of the above proposals and on whether the band 25.5-27 GHz should he allocated to the **ISS** on a secondary basis for non-Federal Government use. Table 3, below, summarizes our proposals for this band.

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[127] *See* Letter *from* Associate Administrator, NTIA, to Chief, OET, dated May 14, 1996.

[128] The United States stated that the band 8025-8400 MHz, which is currently used **for** this purpose, is becoming heavily used by the allocated space services in that band.

[129] Advances in technology are providing higher resolution instruments which in turn require ever larger bandwidths to download their data from the spacecraft. Present data rates are in the 75-150 Mbps range (requiring **up** to 300 megahertz of bandwidth) in the band 8025-8400 MHz. Bandwidths **as** high **as** 400-800 megahertz **are** forecast for some **EES** sensors and cannot be accommodated in the current band.

[130] ***See Final Acts of the World Radiocommunication Conference (WRC-97)*** at 59.

[131] ***See*** January 2000 NTIA Letter at **32**

Table 3: Th and 25.25-27.5 GHz

Federal Government Table		non-Federal Government Table		Summary of Changes
Current	Proposed	Current	Proposed	
25.25-27 GHz FIXED MOBILE Secondary EESS (space-to-space) Secondary standard frequency & time signal-satellite (uplinks) ("SF&TSS uplinks")	25.25-25.5 GHz FIXED MOBILE ISS *5.536* (use limited to SRS & EESS applications, & also transmissions of data originating from industrial & medical activities in space) Secondary SF&TSS uplinks	25.25-27 GHz Secondary EESS (space-to-space) Secondary SF&TSS uplinks	*25.25-25.5* GHz Secondary SF&TSS uplinks	Additional *250* MHz of Gov't ISS. Reduction of *250* MHz for EESS.
	25.5-27 GHz FIXED MOBILE ISS *5.536* EESS (downlinks) Secondary SF&TSS uplinks		25.5-27 GHz Secondary EESS (downlinks) Secondary SF&TSS uplinks	Additional 1.5 GHz of Gov't ISS & EESS; change directional indicator for non-Gov't EESS.
27-27.5 GHz FIXED MOBILE Secondary EESS (space-to-space)	27-27.5 GHz FIXED MOBILE ISS *5.536*	27-27.5 GHz Secondary EESS (space-to-space)	27-27.5 GHz	Additional 500 MHz of Gov't ISS. Reduction of 500 MHz for EESS.

G. Other Allocation Issues

1. Secondary AMS(R)S Allocation in the Band 136-137 MHz

93. At the 1979 World Administrative Radio Conference ("WARC-79"), the band 136-137 MHz was reallocated to the AM(R)S on a primary basis throughout the world, effective January 1, 1990. This action extended the primary allocation for the AM(R)S in the band 117.975-136 MHz by one megahertz and gave incumbent services ten years to evacuate the band. In the United States, the band 136-137 MHz is allocated to the AM(R)S on a primary basis for non-Federal Government use. Footnote US244 states that certain of the frequencies in the band 136-137 MHz are available on a shared basis to the FAA for air traffic control purposes. Footnote US244 also states that existing METSATS in the band 136-137 MHz may continue to operate on a not-to-interfere basis until January 1, 2002. In addition, the Commission has adopted international footnote 591, which allocates the band 117.975-137 MHz to the AMS(R)S on a secondary basis and on the condition that harmful interference is not caused to the AM(R)S.

94. At WRC-97, the United States proposed to delete all secondary allocations from the band 136-137 MHz in order to make the band available exclusively to the AM(R)S in an attempt to satisfy existing and future AM(R)S requirements.[132] In particular, the U.S. proposed that footnote 5.198 (previously numbered as footnote 591) be modified to delete the secondary allocation for the AMS(R)S from the band 136-137 MHz. The U.S. stated that there are no plans to implement AMS(R)S in the band 136-137 MHz. WRC-97 modified footnote 5.198 as requested.

95. We have previously deleted all secondary allocations from the band 136-137 MHz, except for the AMS(R)S allocation. Accordingly, we propose to replace international footnote 591 with footnote 5.198 in the U.S. Table for the band 117.975-136 MHz.[133] The effect of this proposal is to delete

[132] *See U.S.* WRC-97 Proposals at 66

[133] Footnote 5.198 reads as follows: *Additional allocation:* the band 117.975-136 MHz is also allocated to the aeronautical mobile-satellite (R) service on a secondary basis, subject to agreement obtained under No. 9.21.

the unused AMS(R)S allocation from the band 136-137 MHz. In addition, we propose to revise footnote US244 to remove the expired transition plan for METSAT use of the band 136-137 MHz. We request comment on these proposals.

2. The Band 420-450 MHz

96. The band 420-450 MHz is allocated to the radiolocation service on a primary basis for Federal Government use and footnote G2 generally limits such operations to military applications.[134] Additionally, footnote US217 states that, along the shorelines of the contiguous 48 States and Alaska, pulse-ranging radiolocation systems in the band 420-450 MHz and spread spectrum radiolocation systems in the sub-band 420435 MHz may be authorized for Federal and non-Federal Government use on a secondary basis. However, systems authorized under footnote US217 that are proposed to be located within the geographic areas listed in footnote US228 should not expected to be accommodated.[135] The band 420450 MHz is also allocated to the amateur service on a secondary basis. Moreover, footnote US7 states that transmitters in the amateur service operating in the band 420-450 MHz in certain geographic areas are limited to 50 watts peak envelop power ("PEP') unless the Commission can reach an agreement with the applicable military frequency coordinator.[136]

97. On August 8, 2002, NTIA requested that footnotes US7 and US217 be modified and that footnote US228 be deleted.[137] Specifically, NTIA states that footnotes US217 and US228 should be combined as one footnote; and that the geographical areas in footnotes US7 and US228 should be made identical. In addition, NTIA states that the Army requests an increase in the geographic area listed in subparagraph (a) of footnotes US7 and US228 for New Mexico and Texas. Specifically, the Army requests that the current area in footnotes US7 and US228 be expanded to include all of New Mexico and Texas west of longitude 104° 00' West. The Army states the following in support of its request:

> "The new proposed protection criteria is necessary to cover the entire test range operational area. The old restriction boundaries only include the northern half of El Paso, which is located very close to the south end of WSMR (White Sands Missile Range) and to McGregor Range at Fort Bliss. Amateur operations in the metropolitan area of Albuquerque and Santa Fe present a threat to missiles launched at Fort Wingate, NM aimed at the airspace over WSMR. Kirtland Air Force Base, with AF Research Lab (Directed RF Energy Programs), DoD NAG (National Assessment Group), and AFOTEC (Air Force Operational Test and Evaluation Command), is now a DOD test and evaluation center using areas both South (Manzano Mountain range) and West (Fort Sumner) of Albuquerque. Some testing in this area is vulnerable to higher power Amateur operations."

98. The effect of Army's request would be to more than double the combined size of those areas of Texas and New Mexico where (1) the maximum transmitter power that amateur stations may use is generally limited to 50 watts PEP rather than the general limit of 1.5 kW PEP and (2) spread spectrum

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[134] See 47 C.F.R. § 2.106, footnote G2.

[135] See 47 C.F.R. § 2.106, footnotes US217, US228.

[136] See 47 C.F.R. § 2.106, footnote US7. Sub-bands within the band 420-450 MHz are also allocated to the amateur-satellite, land mobile, and space operation services and for space telecommand and low power radio control operations. These allocations are not material to the changes we propose herein.

[137] See Letter for Acting Associate Administrator, Office of Spectrum Management, NTIA, to Chief, OET, FCC, dated August 8, 2002 ("NTIA Amateur/Radiolocation Letter").

radiolocation systems operating in the sub-band 420435 MHz should not expect to be accommodated.[138] We propose to make the changes requested by NTIA. See the Appendix for the proposed revisions to footnotes US7 and US217. Footnote US228 w be deleted. We request comment on these proposals.

99. As stated above, the band 420-450 MHz is allocated to the radiolocation service on a primary basis for Federal Government use. On August 13, 2002, NTIA notified us that it had recently specified that Federal Government wind profilers would operate in the sub-band 448-450 MHz.[139] Wind profilers are sensitive Doppler radars that measure wind speed and direction at a variety of altitudes. Specifically, NTIA has added the following Federal Government footnote to its Manual:

> G129 Government wind profilers are authorized to operate on a primary basis in the radiolocation service in the frequency band 448450 MHz with an authorized bandwidth of no more than 2 MHz centered on 449 MHz, subject to the following conditions: 1) wind profiler locations must be pre-coordinated with the military services to protect fixed military radars; and 2) wind profiler operations shall not cause harmful interference to, nor claim protection from, military mobile radiolocation stations that are engaged in critical national defense operations.

100. Because these operations are permitted under the existing radiolocation allocation, we will place this informational footnote in the Federal Government Table of our Rules. Further, we request comment on whether non-Federal Government wind profilers should also be allowed in this spectrum and if so, whether such an allocation should be on a primary or secondary basis. We also request comment on the impact of wind profiler operations on non-Federal Government operations permitted in this frequency range.

3. On-board Mobile Radiotelephony Communications

101. In most of the world, the maritime mobile frequencies that may be used for on-board mobile radiotelephony communications are listed in footnote 5.287 (previously numbered as 669).[140] However, in the territorial waters of the United States and the Philippines, some of the frequencies used for on-board communications differ from the frequencies used in rest of the world.[141] At WRC-97, footnote 5.287 was revised to permit the use of equipment designed for 12.5 kHz channel spacing. Such

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[138] *See* 47 C.F.R. § 97.313.

[139] See Letter from Acting Associate Administrator, Office of Spectrum Management, NTIA to Chief, OET, FCC, dated August 13,2002.

[140] Footnote 5.287 reads as follows: "In the maritime mobile service, the frequencies 457.525 MHz, 457.550 MHz, 457.575 MHz, 467.525 MHz, 467.550 MHz and 467.575 MHz may be used by on-board communication stations. Where needed, equipment designed for 12.5 kHz channel spacing using also the additional frequencies 457.5375 MHz, 457.5625 MHz, 467.5375 MHz and 467.5625 MHz may be introduced for on-board communications. The use of these frequencies in territorial waters may be subject to the national regulations of the administration concerned. The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174 (see Resolution 341 (WRC-97))."

[141] Footnote 5.288 (previously numbered as 670) reads as follows: "In the territorial waters of the United States and the Philippines, the preferred frequencies for use by on-board communication stations shall be 457.525 MHz, 457.550 MHz, 457.575 MHz and 457.600 MHz paired, respectively, with 467.750 MHz, 467.775 MHz, 467.800 MHz and 467.825 MHz. The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174." See 47 C.F.R. § 80.373 (g), wherein these frequencies are listed in our Rules for private communications, limited to on-board communications. We note that Canada is no longer listed in footnote 5.288.

"narrowbanded" on-board mobile radiotelephony equipment may also use the following additional carrier 'frequencies: 457.5375 MHz, 457.5625 MHz, 467.5375 MHz and 467.5625 MHz.[142]

102. In the United States, the frequencies 457.5375 MHz and 457.5625 MHz are used by eligibles in the Industrial/Business Pool.[143] However, because the additional carrier frequencies are to be used outside U.S. temtorial waters, we do not believe that their use will cause harmful interference to these land mobile users. Accordingly, we propose to replace international foomote 669 with footnote 5.287 in the U.S. Table for the band 456-470 MHz. The effect of this proposal would be to permit maritime mobile equipment that is more spectrum-efficient to have access to ten instead of six channels for on-board communications in areas outside U.S. territorial waters. We request comment on this proposal.

4. IFPRS Use in the Bands 2.1-2.2 GHz and 10.7-11.7 GHz

103. We have recently reviewed our licensing tiles for Part 23, the International Fixed Public Radiocommunication Services.[144] Footnotes NG23 and NG41 state that frequencies in the band 2100-2200 MHz and in the bands 3700-4200 MHz, 5925-6425 MHz, and 10.7-11.7 GHz, respectively, may also be used for IFPRS communications.[145] There are only three licensees using the bands 3700-4200 MHz and 5925-6425 MHz ("C-band) on several Caribbean islands. There are no IFPRS operations currently in the bands 2100-2200 MHz and 10.7-11.7 GHz. In order to remove regulations that are no longer needed, we propose to delete footnote NG23, which pertains to the band 2100-2200 MHz, and to revise footnote NG41 to remove the band 10.7-11.7 GHz because we no longer have any IFPRS licensees operating in these bands. We also propose to delete all cross-references to Part 23, except in C-band, from column 6 of our Table of Frequency Allocations because Part 23 does not list any frequencies, which is the purpose of a rule part cross reference.[146] We make this proposal on our own initiative to remove outdated regulations from our Rules. We request comment on this proposal.

5. Secondary MMSS Use of the band 14-14.5 GHz

104. The 14-14.5 GHz band is allocated for FSS uplinks on a primary basis for non-Federal Government use. The band 14-14.5 GHz is heavily used by Very Small Aperture Terminals ("VSATs") for uplinking to geostationary satellites.'" These VSAT systems provide video and data communications and are widely deployed at business locations, ranging from the largest corporate headquarters to the smallest convenience stores, Recently, we authorized NGSO FSS gateway and user terminal uplinks to operate in the band 14-14.5 GHz.[148] The band 14-14.5 GHz is also allocated for LMSS uplinks on a

[142] Previously, all on-board mobile radiotelephony equipment used 25 kHz channel spacing.

[143] See 47 C.F.R. § 90.35.

[144] *See* 47 C.F.R. Part 23. The IFPTS service was the original means by which international telephone calls were completed. Since 1956, the IFPTS service has atrophied as first overseas voice cables, then FSS links, and now fiber optic cables have essentially replaced radio for international calling.

[145] See 41 C.F.R. 2.106, footnotes NG23 and NG41

[146] *See* 47 C.F.R. § 2.106, column 6.

[147] Our database indicates that there are 2672 authorizations issued for GSO FSS earth stations in the 14-14.5 GHz band. The authorizations do not indicate the actual number of earth stations or antennas that a licensee might deploy. For example, since this is a VSAT band, a single GSO FSS authorization could cover several hundred VSAT antennas

[148] *See Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range,* ET Docket No. 98-206, *First Repon and Order and Further Notice of Proposed Rule Making,* 16 FCC Rcd 4096 (2001).

secondary basis for non-Federal Government use. This LMSS allocation is used by OmniTracs, a satellite-based mobile communications and tracking system that provides real-time messaging and position reporting between fleets and their operations centers.[149]

105. The sub-band 14-14.2 GHz is allocated to the radionavigation service on a primary basis for Federal and non-Federal Government use; however, stations in the radionavigation service operate on a secondary basis to FSS uplinks.[150] The sub-band 14-14.2 GHz is also allocated to the space research service on a secondary basis for Federal and non-Federal Government use. In addition, the sub-band 14.2-14.4 GHz is allocated to the mobile except aeronautical mobile service on a secondary basis for non-Federal Government use. The Commission has made this spectrum available for assignment to television pickup and television non-broadcast pickup stations in the Local Television Transmission Service.[151] The sub-band 14.4-14.5 GHz is allocated to the fixed and mobile services on a secondary basis for Federal Government use. Footnote US203 states that radio astronomy observations of the formaldehyde line frequencies 14.47-14.5 GHz may be made at certain observatories.[152]

106. At WRC-97, the U.S. proposed to allocate the band 14-14.5 GHz for MMSS uplinks on a secondary basis. The U.S. stated that "several hundred thousand land mobile-satellite terminals have been in operation around the world on a secondary basis for many years. They have proven to be compatible with other services in the band. In recent years, the same terminals have been permitted by many administrations to offer maritime mobile-satellite service in the same band. Such operation has proven to be compatible with other services in this band. It can be concluded that maritime mobile-satellite service is compatible in this band. Aeronautical mobile-satellite applications in this band will require further studies."[153] WRC-97 allocated the band 14-14.5 GHz to the mobile-satellite (Earth-to-space) except aeronautical mobile-satellite service on a secondary basis.

107. We observe that LMSS operates in the United States on a secondary basis without causing harmful interference to ubiquitously deployed VSATs. As indicated above, other nations have implemented MMSS uplinks in the band 14-14.5 GHz on a secondary basis. We agree with the *U.S. WRC-97 Proposals* that using the same or similar terminals to offer MMSS services in the band 14-14.5 GHz should be compatible with other services in this band, especially since the LMSS allocation has been successfully used in the United States for some time.[154] Accordingly, we propose to allocate the band 14-14.5 GHz to the mobile-satellite (Earth-to-space) except aeronautical mobile-satellite service on a secondary basis for non-Federal Government use.[155] We request comment on this proposal.

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[149] Qualcomm's OmniTracs service processes more than six million transactions each day sent to and from a quarter-million trucks. See Qualcomm Service Keeps on Trucking, July 13,2001 at http://www.business2.codarticles/web/print/O, 1650,16490,FF.html.

[150] *See* 47 C.F.R. § 2.106, footnote US292.

[151] See 47 C.F.R. Part 101, Subpart J. Our licensing database shows 24 Local Television Transmission, 1 TV pickup, 1 Industrial/ Business Pool, 1 point-to-point microwave, and 2 land mobile radiolocation records for the band 14.2-14.4GHz.

[152] See 47 C.F.R. § 2.106, footnote US203.

[153] *See United States of America Proposals for the Work of the Conference,* Document 30-E, dated September 4, 1997, summary of the United States proposals for agenda item 1.9.1.

[154] The OmniTracs service was first offered to the public in 1988.

[155] The unneeded secondary allocation for LMSS (uplinks) would be deleted.

H. Ministerial Amendments

108. We propose to make the following ministerial amendments to Part 2 of our Rules. In the "Little LEO' bands of the US. Table,[156] we would replace international footnotes 599A, 608A, 608B, and 647B with footnotes 5.208, 5.219, 5.220, and 5.264, respectively, which are non-substantive changes. We would merge footnote US322 into US320, that is, add the bands 149.9-150.05 MHz and 399.9-400.05 MHz to footnote US320, and delete superfluous footnotes US322 and 599B from the **U.S.** Table.[157] We would also delete expired footnote US318 from the band 137-138 MHz and the Part 25 cross reference from the band 136-137 MHz. In addition, we would delete expired text from Section 25.202(a)(3), which concerns the allocation status of certain of the Little LEO bands. These changes would merely clean up our rules to remove confusion and outdated provisions.

109. In WT Docket No. 01-289, we proposed to delete the Civil Air Patrol from Part 87 **of** our Rules because we have no formal relationship with the Civil **Air** Patrol, which is currently authorized by the **U.S.** Air Force and NTIA.[158] We did not propose to amend Part 2 in that proceeding. Therefore, we would delete footnote US10, which states that several frequencies in the band 138-144 MHz are available for use to the Civil Air Patrol, herein.

110. We would delete international footnote 510 from the band 144-146 MHz in the non-Federal Government Table. This footnote, through its reference of Resolution 640, invited administrations to provide for the needs of international disaster communications and for the needs of emergency communications using the certain amateur bands. At WRC-2000, footnote 510, which had been renumbered as 5.120, was deleted.[159] We have recently proposed to delete footnote 510 from the amateur bands below 28 MHz.[160]

111. We would revise footnote US48 to remove a requirement that is already shown in the Table. That is, there is a primary direct Table allocation for Federal Government radiolocation and a secondary direct Table allocation for non-Federal Government radiolocation in the band 5350-5460 MHz. Thus, it is unnecessary and confusing to include the band 5350-5460 MHz in footnote US48. In contrast, the band 9000-9200 MHz is allocated to the radiolocation service on a secondary basis for both Federal and non-Federal Government use. Therefore, we would revise footnote US48 to read as follows:

> US48 In the band 9000-9200 MHz, the use of the radiolocation service by non-Federal Government licensees may be authorized on the condition that harmful interference is not caused to the aeronautical radionavigation service or to the Federal Government radiolocation service.

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[156] Little LEOs is the common name **for** Non-Voice Non-Geostationary MSS systems. Little LEO downlink spectrum is allocated on aprimary basis in the hands 137-137.025 MHz, 137.175-137.825 MHz, and 400.15-401 MHz and on a secondary basis in the bands 137.025-137.175MHz and 137.825-138 **MHz.** Little LEO uplink spectrum is allocated on a primary basis in the bands 148-150.05MHz and 399.9-400.05 MHz.

[157] We cannot replace international footnote 599B with 5.209 because we have not allocated the bands 455-456 **MHz** and 459-460 MHz **for** Little LEO operations.

[158] *See Review* of *Part 87 of the Commission's Rules Concerning rhe Aviation Radio Service,* WT Docket No. 01-289, *Norice* of *Proposed Rule Making,* 16 FCC Rcd 19,005 at ¶ 35.

[159] *See WRC-2000 Final Acts* at 7.

[160] *See Amendment of Parrs 2, 73, 74, 80, 90, and 97 of the commission's Rules to Implement Decisions from World Radiocommunication Conferences Concerning Frequency Bands Below 28000 kHz,* ET Docket No. 02-16, *Norice of Proposed Rule Making and Order,* **FCC** 02-23, rel. February 7, 2002, at ¶ 35.

112. We would revise footnote US110 to remove requirements that are already shown in the Table. That is, there are primary direct Table allocations for Federal Government radiolocation and secondary direct Table allocations for non-Federal Government radiolocation in all of the bands listed in footnote US110, except for the band 9200-9300 MHz, which is allocated to both the Federal and non-Federal Government radiolocation service on a secondary basis. The protection requirement with regard to airborne doppler radars at 8800 MHz and to airport surface detection equipment ("ASDE) operating between 15.7-16.2 GHz is not needed because both of these functions are covered under the radiolocation allocation. Therefore, we would revise footnote US110 to read as follows:

> US110 In the band 9200-9300 MHz, the use of the radiolocation service by non-Federal Government licensees may be authorized on the condition that harmful interference is not caused to the maritime radionavigation service or to the Federal Government radiolocation service.

113. We would revise footnote US310 by specifying the pfd limits for all angles of arrival. Currently US310 specifies only the maximum and *minimum* pfd limits and references CCIR Recommendation 510-1, which has been renumbered as Recommendation ITU-R SA.510-2, for the specific requirements. Rather than reference ITU Recommendations that could be changed, therefore changing our regulations without notice and comment, we would place the requirements of Recommendation ITU-R SA.510-2 into our rules.

114. We would add a reference to footnote NG167 in the band 17.3-17.7 GHz in order to explicitly tie the allocation for the broadcasting-satellite service in the band 17.3-17.7 GHz to its feeder link allocation in the band 24.75-25.25 GHz. While this requirement already exists, we believe that having reference to footnote NG167 in both bands makes the requirement clearer.

115. We would make the following changes to the rule part cross-references in column 6 of the Table of Frequency Allocations:[161] (1) delete **Part** 87, the Aviation Services, from the band 29.8-30 MHz and add Part 87 to the bands 72-73 MHz, 74.6-74.8 MHz, and 156.2475-157.0375 MHz; (2) add Part 90, the Private Land Mobile Radio Services, to the band 410420 MHz; (3) add **Part** 80, the Maritime Services, to the band 1525-1535 MHz; and (4) add **Part** 25, Satellite Communications, to the band 1660-1660.5 MHz. This action would update the rule pan cross-references, thus **making** our Rules more useful to the pubiic.

116. We would also make the following changes to eliminate outdated requirements or correct typographical errors: (1) clarify in footnote US217 that spread spectrum radiolocation systems may be authorized for Federal and non-Federal Government use in the sub-band 420435 MHz within Alaska and the contiguous 48 states and correct several typographical errors; (2) correct a typographical error in footnote US316 by changing the **NEXRAD** expansion band from 2900-3100 MHz to 2900-3000 MHz; (3) delete the references to footnote NG30 in the band 806-894 MHz and to footnote NG43 in the band 806-849 MHz from the non-Federal Government Table because these footnotes have previously been deleted, but were not fully removed from the non-Federal Government Table;[162] (4) delete footnote NG63 because our licensing files show that there are no television broadcast translator stations still authorized to operate in the band 806-890 MHz (old TV channels 70-83); and (5) delete footnote US54 because Federal Government radiolocation systems that could cause harmful interference to ARNS have had at least since

[161] The FCC rule part cross-references are not allocations **and** are provided for informational purposes. ***See*** 47 C.F.R. § 2.105(d)(6).

[162] ***See Reallocation of Television Channels 60-69, the 746-806 MHz Band,*** ET Docket No. 97-157, ***Report and Order,*** 12 FCC Rcd 22,953 (1998).

1961 to move to other frequency bands.[163]

117. International footnote 5.149 states that, in making assignments to stations of other services to which the bands listed in the footnote are allocated, administrations are urged to take all practicable steps to protect the RAS from harmful interference.[164] The Commission has domestically implemented international footnote 5.149 in many of the bands listed in this footnote by adding it to the U.S. Table. Recently, in the V-band ***Reporr*** and Order, we decided to employ a new similarly worded United States footnote US342 (instead of footnote 5.149) in the frequency range from 36 GHz to **51** GHz in order to more clearly state which bands Commission licensees should protect the RAS from harmful interference.[165] We took this action because different domestic requirements have been adopted in certain of the frequency bands listed in footnote 5.149.[166] In addition, several of the bands listed in footnote 5.149 are passive bands in the United States and therefore, the urgings of 5.149 are moot.[167] With regard to the frequency range from 28 MHz to 36 GHz, we observe that footnote 5.149 has previously been added to the U.S. Table in the bands 37.5-38.25 MHz, 322-328.6 MHz, 1330-1400 MHz, 1610.6-1613.8 MHz, 1660-1660.5 MHz, 1668.5-1670 MHz, 3260-3267 MHz, 3332-3339 MHz, 3345.8-3352.5 MHz, 4825-4835 MHz, 49504990 MHz, 6650-6675.2 MHz, 14.47-14.5 GHz, 22.01-22.5 GHz, 22.81-22.86 GHz, 23.07-23.12 GHz, and 31.2-31.3 GHz. We propose to replace the reference to footnote 5.149 with US342 in the U.S. Table for these frequency bands. We also propose to add the bands 49504990 MHz and 6650-6675.2 MHz to the text of footnote US342; all other bands in the frequency range from 28 MHz to 36 GHz have previously been added to footnote US342.[168] In addition, we propose to delete footnote 5.149 from the passive band 1660.5-1668.4 MHz because no station may transmit in this frequency band.[169] Consistent with WRC-2000's revision of footnote 5.149, we also propose to revise footnote US342 by deleting the indication showing which frequency bands are used for spectral line observations. ***See*** the Appendix for the proposed revision of footnote US342. In addition, we request comment on whether footnote US342 should be revised to state that licensees are "urged" (similar to footnote 5.149), instead of required (as currently indicated in footnote US342), to take all practicable steps to protect the **RAS** from harmful interference.

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[163] We observe that as a condition of its allocation, the non-Federal Government radiolocation service may not **cause** interference to **ARNS** or to the Federal Government radiolocation service. See 47 C.F.R. § 2.106, footnote US48.

[164] See 47 C.F.R. § 2.106, footnote 5.149

[165] *See* Allocation and Designafion of *Spectrum* for *Fixed-Satellite* Services in the *37.5-38.5 GHz, 40.5-41.5 GHz,* and 48.2-50.2 *GHz* frequency bands; Allocafion of Spectrum *to* Upgrade Fixed and Mobile Allocarions in fhe *40.5-*42.5 *GHz* Frequency Band; Allocafion of Spectrum *in* fhe *46.9-47.0 GHz* Frequency *Band for* Wireless Services; and Allocation of *Spectrum* in the *37.0-38.0 GHz* and 40.0-40.5 *GHz* for Governmenr Operations, IB Docket No. 97-95, *Report* and Order, 13 FCC Rcd 24649 (1999) ("*V-band Report* and Order").

[166] Specifically, the Commission has adopted different requirements in the bands 406.1-410 MHz, 1718.8-1722.2 MHz, 2655-2690 MHz, 10.6-10.68 GHz, and 72.77-72.91 GHz. See 47 C.F.R. § 2.106, footnotes US117, US256, US269, US277, and US270, respectively.

[167] **In** the United States, no station will be authorized to transmit in the bands 608-614 MHz (except for medical telemetry equipment), 1660.5-1668.4 MHz, 4990-5000 MHz, and 31.5-31.8 GHz. See 47 C.F.R. § 2.106, footnote US246. In addition, the band 73-74.6 MHz is allocated exclusively to the **RAS.**

[168] The text of footnote US342 that was adopted in the *V-band Report and* Order should have included all frequency bands from footnote ***5.149*** that were applicable to the United States; however, by oversight, the bands 4940-4990 MHz and 6650-6675.2 MHz were not listed. In addition, references to footnote 5.149 were replaced by reference to footnote US342 in the U.S. Table only in the frequency range from 36 GHz to 51 GHz.

[169] See 41 C.F.R. § 2.106, footnote US246.

118. We note that the band 73-74.6 MHz is allocated exclusively to the RAS. In the United States, passive bands are listed in footnote US246, which states that no station will be authorized to transmit in the bands listed therein. Accordingly, we propose to add the band 73-74.6 MHz to footnote US246.

IV. PROCEDURAL MATTERS

A. Initial Regulatory Flexibility Certification

119. The Regulatory Flexibility Act of 1980, as amended ("RFA"),[170] requires that an initial regulatory analysis be prepared for notice-and-comment tule making proceedings, unless the agency certifies that the "the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities."[171] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[172] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[173] A "small business concern" is one which: (1) is independently owned and operated (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration ("SBA").[174]

120. This *Notice of* Proposed *Rule Making ("Norice")* proposes to amend Parts 2, 25, and 87 of our Rules in order to implement domestically various allocation decisions from several World Radiocommunication Conferences concerning the frequency bands between 28 MHz and 36 GHz and to otherwise update our Rules in this frequency range. These allocation proposals mainly affect Federal agencies.[175] Those proposals that are most significant to non-Federal Government operations are: (1) implementing generic L-band MSS allocations; (2) allocating the band 1164-1189 MHz to the RNSS; and (3) deleting unused and limited FSS and BSS allocations from the band 2500-2690 MHz. Concerning L-band MSS, currently there is only one U.S. licensee. Concerning the RNSS allocation, only one or at most a few large companies are expected to be able to launch and maintain RNSS systems, which are expensive. The last proposal merely deletes unused allocations, with no direct effect on licensees or regulatees.

121. We have determined that the tules proposed in this *Notice* will not, if promulgated, have a significant economic impact on a substantial number of small entities. Accordingly, we hereby certify that this *Notice* will not have a significant economic impact on a substantial number of small entities. The Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, will send a

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[170] *See* U.S.C. § 603. The RFA, see *5* U.S.C. § 601 -612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. Law No. 104-121, Title II, 110 Stat. *857* (1996).

[171] 5 U.S.C. § 605(b).

[172] 5 U.S.C. § 601(6)

[173] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in the Small Business Act, 15 U.S.C. § 632). Pursuant to *5* U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

[174] 15 U.S.C. § 632.

[175] See paras. 5-6, supra.

copy of this ***Notice,*** including this certification, to the Chief Counsel for Advocacy of the Small Business Administration.[176] A copy will also be published in the Federal Register.[177]

B. *Ex Parte* Rules - - Permit-But-Disclose Proceeding

122. This is a permit-but-disclose notice and comment rule making proceeding. Ex ***parte*** presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed as provided in the Commission's rules. ***See generally*** 47 C.F.R. §§ 1.1202, 1.1203, and 1.2306(a).

C. Comments

123. Pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R. §§ 1.415 and 1.419, interested parties may file comments on or before 60 days from date of publication in the Federal Register and reply comments on or before 90 days from date of publication in the Federal Register. Comments may be filed using the Commission's Electronic Comment Filing System ("ECFS"), http://www.fcc.gov/e-file/ecfs.html, or by filing paper copies. ***See Electronic Filing of Documents in Rulemaking Proceedings,*** 63 Fed. Reg. 23,121 (1998).

124. Comments filed through the ECFS can be sent as an electronic file via the Internet to http://www.fcc.gov/e-file/ecfs.html. Generally, only one copy of an electronic submission must be filed. If multiple docket or rulemaking numbers appear in the caption of this proceeding, however, commenters must transmit one electronic copy of the comments to each docket or rulemaking number referenced in the caption. In completing the transmittal screen, commenters should include their full name, U.S. Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions for e-mail comments, commenters should send an e-mail to ecfs@fcc.gov, and should include the following words in the body of the message, "get form <your e-mail address." A sample form and directions will be sent in reply. Parties who choose to tile by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appear in the caption of this proceeding, commenters must submit two additional copies for each additional docket or rulemaking number.

125. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail (although we continue to experience delays in receiving U.S. Postal Service mail). The Commission's contractor, Vistronix, Inc., will receive hand-delivered or messenger-delivered paper filings for the Commission's Secretary at 236 Massachusetts Avenue, N.E., Suite 110, Washington, D.C. 20002. The filing hours at this location are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building. Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743. U.S. Postal Service first-class mail, Express Mail, and Priority Mail should be addressed to 445 12th Street, SW, Washington, D.C. 20554. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

126. Parties who choose to file by paper should also submit their comments on diskette. Such a submission should be on a 3.5-inch diskette formatted in an IBM compatible format using Microsoft Word or compatible software. The diskette should be accompanied by a cover letter and should be submitted in "read only" mode. The diskette should be clearly labeled with the commenter's name, proceeding (including the lead docket number, type of pleading (comment or reply comment), date of

[176] 5 U.S.C. § 605(b).

[177] 5 U.S.C. § 605(b).

submission, and the name of the electronic file on the diskette. The label should also include the following phrase "Disk Copy – Not an Original." Each diskette should contain only party's pleading, preferably in a single electronic file. In addition, commenters must send diskette copies to the Commission's copy contractor, Qualex International, Portals II, 445 12th Street, SW, Room CY-B402, Washington, DC, 20554.

127. Alternative formats (computer diskette, large print, audio cassette and Braille) are available to persons with disabilities by contacting Brian Millin at (202) 418-7426, TTY (202) 418-2555, or via e-mail to bmillin@fcc.gov. This Notice can also be downloaded at http://www.fcc.gov/oet.

D. Contact Person

128. For further information concerning this rule making proceeding contact Tom Mooring at (202) 418-2450, tmooring@fcc.gov, Office of Engineering and Technology.

V. ORDERING CLAUSES

129. Accordingly, IT IS ORDERED that pursuant to Sections 1, 4, 301, 302(a), 303,307, 309, 316, 332, 334, and 336 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 151, 154, 301, 302(a), 303, 307, 309, 316, 332, 334, and 336, the NOTICE OF PROPOSED RULE MAKING is hereby ADOPTED.

130. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this NOTICE OF PROPOSED RULE MAKING, including the Initial Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX: PROPOSED RULES

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR parts 2, 25, and 87 as follows:

PART 2 -- FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

1. The authority citation for Part 2 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 302a, 303, and 336, unless otherwise noted.

2. Section 2.1 is revised by adding the following definitions in alphabetic order:

§ 2.1 Terms and definitions.

* * * * *

Differential Global Positioning System (DGPS) Station. A differential **RNSS** station for specific augmentation of GPS.

Differential Radionavigation Satellite Service (Differential RNSS) Station. A station used for the transmission of differential correction data and related information (such as ionospheric data and **RNSS** satellite integrity information) as an augmentation to an RNSS system *for* the purpose of improved navigation accuracy.

* * * * *

3. Section 2.106, the Table of Frequency Allocations, is amended as follows:

a. Revise pages 22-75

b. In the list of International Footnotes under heading II., remove footnotes 591, 599A, 599B, 608A, 608B, 647B, 669, and 792A.

c. In the list of United States (US) Footnotes, revise US7, US48, US110, US217, US244, US246, US262, US276, US277, US278, US310, US316, US320, US328, and US342; remove US10, US54, US228, US269, US318, and US322; and add footnotes USxxx, USyyy, and USzzz.

d. In the list *of* Non-Federal Government (NG) Footnotes, remove NG23, NG47, NG63, NG101, and NG102; and revise NG41.

e. In the list of Federal Government (G) Footnotes, revise footnote G2 and add footnote G129.

§ 2.106 Table of Frequency Allocations.

The revisions and additions read as follows:

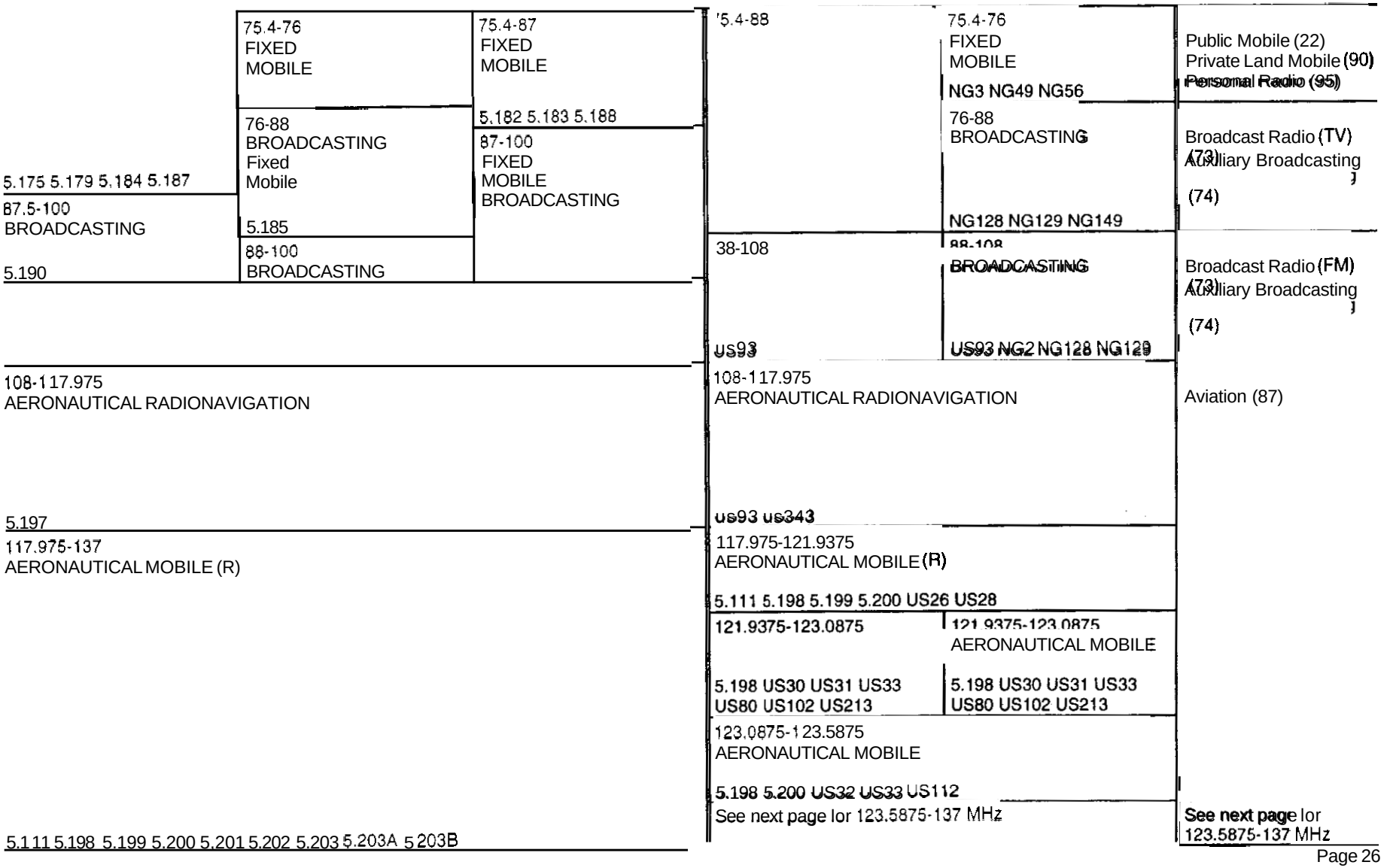
* * * * *

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	*Federal Government*	*Non-Federal Government*	
28-29.7 AMATEUR AMATEUR-SATELLITE			28-29.89	28-29.7 AMATEUR AMATEUR-SATELLITE US340	Amateur (97)
				29.7-29.8 LAND MOBILE US340	Private Land Mobile (90)
29.7-30.005 FIXED MOBILE				29.8-29.89 FIXED US340	
			US340		
			29.89-29.91 FIXED MOBILE US340	29.89-29.91 US340	
			29.91-30 US340	29.91-30 FIXED US340	
30.005-30.01 SPACE OPERATION (satellite identification) FIXED MOBILE SPACE RESEARCH			30-30.56 FIXED MOBILE	30-30.56	
30.01-37.5 FIXED MOBILE			30.56-32	30.56-32 FIXED LAND MOBILE NG124	Private Land Mobile (90)
			32-33 FIXED MOBILE	32-33	
			See next page for 33-37.5 MHz		See next page for 33-37.5 MHz

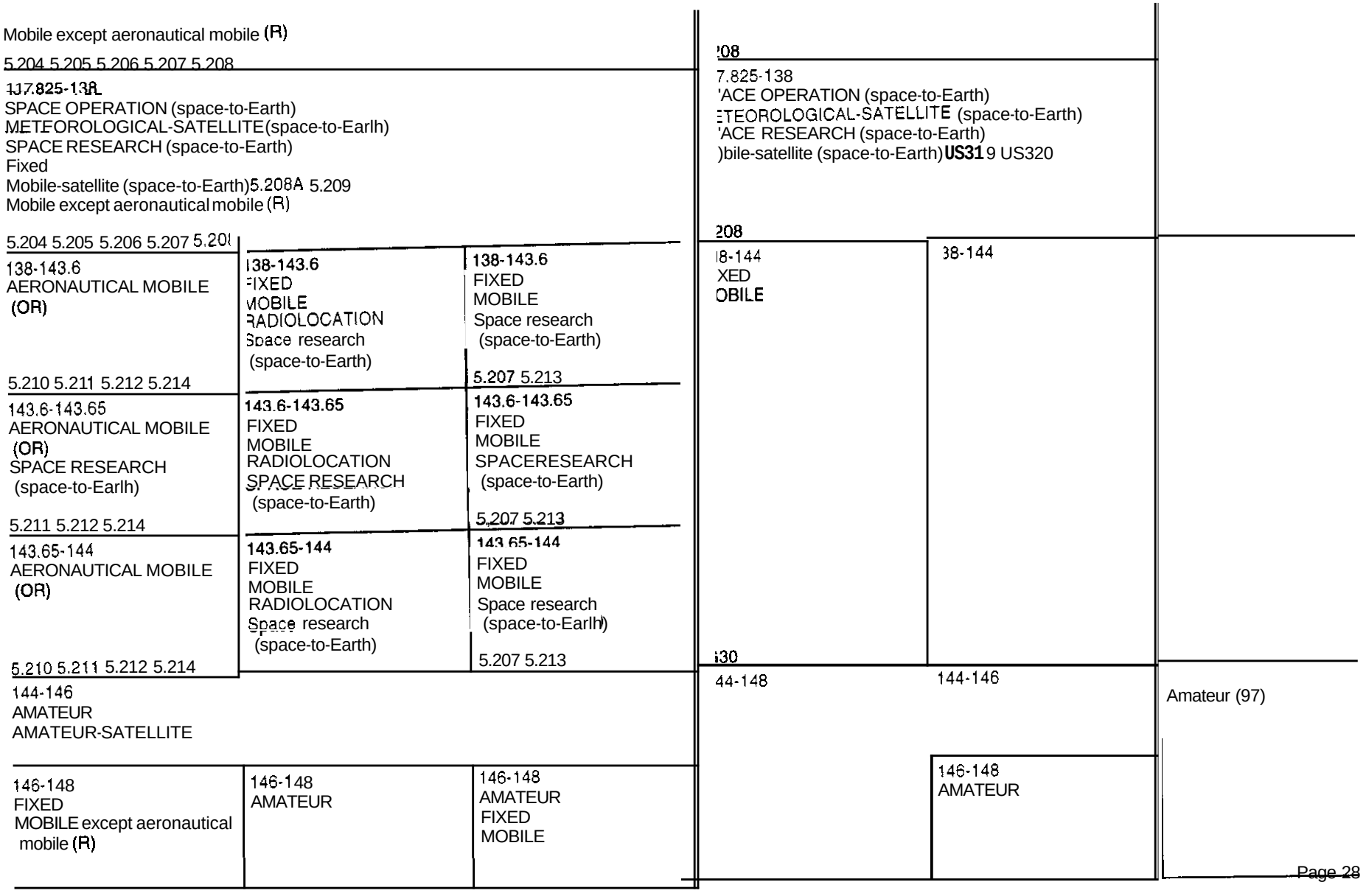
International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
See previous page for 30.01-37.5 MHz			33-34	33-34 FIXED LAND MOBILE NG124	Private Land Mobile (90)
			34-35 FIXED MOBILE	34-35	
			35-36	35-36 FIXED LAND MOBILE	Public Mobile (22) Private Land Mobile (90)
			36-37 FIXED MOBILE us220	36-37 us220	
			37-37.5	37-37.5 LAND MOBILE NG124	Private Land Mobile (90)
37.5-38.25 FIXED MOBILE Radio astronomy			37.5-38 Radio astronomy us342	37.5-38 LAND MOBILE Radio astronomy US342 NG59 NG124	
5.149			38-38.25 FIXED MOBILE RADIO ASTRONOMY US81 US342	38-38.25 RADIO ASTRONOMY US81 US342	
38.25-39.986 FIXED MOBILE			38.25-39 FIXED MOBILE	38.25-39	
			39-40	39-40 LAND MOBILE NG124	Private Land Mobile (90)
39.986-40.02 FIXED MOBILE Space research			40-42 FIXED MOBILE	40-40.98	ISM Equipment (18) Private Land Mobile (90)

40.02-40.98 FIXED MOBILE 5.150				5.150 US210	
40.98-41.015 FIXED MOBILE Space research, 5.160 5.161				40.98-42	
41.015-44 FIXED MOBILE 5.160 5.161			5.150 US210US220 42-46.6	US220 42-43.69 FIXED LAND MOBILE NG124 NG141 43.69-46.6 LAND MOBILE NG124 NG141	Public Mobile (22) Private Land Mobile (90) Private Land Mobile (90)
44-47 FIXED MOBILE 5.162 5.162A			46.6-47 FIXED MOBILE	46.6-47	
47-68 BROADCASTING 5.162A 5.163 5.164 5.165 5.169 5.171	47-50 FIXED MOBILE See next page lor 50-68 MHz	47-50 FIXED MOBILE BROADCASTING 5.162A	47-49.6 49.6-50 FIXED MOBILE See next page lor 50-73 MHz	47-49.6 LAND MOBILE NG124 49.6-50 See next page lor 50-72 MHz	Private Land Mobile (90) See next page for 50-72 MHz

Region 1	Region 2	Region 3	United States Table		FCC Rule Part(s)
			Federal Government	Non-Federal Government	
See previous page for 47-68 MHz	50-54 AMATEUR 5.162A 5.166 5.167 5.168 5.170		50-73	50-54 AMATEUR	Amateur (97)
	54-68 BROADCASTING Fixed Mobile 5.172	54-68 FIXED MOBILE BROADCASTING 5.162A		54-72 BROADCASTING NG128 NG149	Broadcast Radio (TV) (73) Auxiliary Broadcasting (74)
68-74.8 FIXED MOBILE except aeronautical mobile	68-72 BROADCASTING Fixed Mobile 5.173	68-74.8 FIXED MOBILE		72-73 FIXED MOBILE NG3 NG49 NG56	Public Mobile (22) Aviation (87) Private Land Mobile (90) Personal Radio (95)
	72-73 FIXED MOBILE				
	73-74.6 RADIO ASTRONOMY 5.178		73-74.6 RADIO ASTRONOMY US74 US246		
5.149 5.174 5.175 5.177 5.179	74.6-74.8 FIXED MOBILE	5.149 5.176 5.179	74.6-74.8 FIXED MOBILE US273		Aviation (87) Private Land Mobile (90)
					Aviation (87)
75.2-87.5 FIXED MOBILE except aeronautical mobile	75.2-75.4 FIXED MOBILE 5.179		75.2-75.4 FIXED MOBILE US273		Private Land Mobile (90)


75.4-76
FIXED
MOBILE
75.4-87
FIXED
MOBILE
5.182 5.183 5.188
76-88
BROADCASTING
Fixed
Mobile
5.185
87-100
FIXED
MOBILE
BROADCASTING
5.175 5.179 5.184 5.187
87.5-100
BROADCASTING
5.190
88-100
BROADCASTING
'5.4-88
75.4-76
FIXED
MOBILE
NG3 NG49 NG56
Public Mobile (22)
Private Land Mobile (90)
Personal Radio (95)
76-88
BROADCASTING
NG128 NG129 NG149
Broadcast Radio (TV)
Auxiliary Broadcasting (74)
38-108
BROADCASTING
US93
US93 NG2 NG128 NG129
Broadcast Radio (FM)
Auxiliary Broadcasting (74)
108-117.975
AERONAUTICAL RADIONAVIGATION
Aviation (87)
5.197
us93 us343
117.975-137
AERONAUTICAL MOBILE (R)
117.975-121.9375
AERONAUTICAL MOBILE (R)
5.111 5.198 5.199 5.200 US26 US28
121.9375-123.0875
AERONAUTICAL MOBILE
5.198 US30 US31 US33 US80 US102 US213
5.198 US30 US31 US33 US80 US102 US213
123.0875-123.5875
AERONAUTICAL MOBILE
5.198 5.200 US32 US33 US112
See next page lor 123.5875-137 MHz
See next page lor 123.5875-137 MHz
5.111 5.198 5.199 5.200 5.201 5.202 5.203 5.203A 5.203B

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
See previous page lor 117.975-137 MHz			123.5875-128.8125 AERONAUTICAL MOBILE (R) 5.198 US26		Aviation (87)
			128.8125-132.0125 5.198	128.8125-132.0125 AERONAUTICAL MOBILE (R) 5.198	
			132.0125-136.00 AERONAUTICAL MOBILE (R) *5.198 US26*		
			136-137 US244	136-137 AERONAUTICAL MOBILE (R) US244	
137-137.025 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.209 SPACE RESEARCH (space-lo-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208			137-137.025 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US319 US320 SPACE RESEARCH (space-to-Earth) 5.208		Satellite Communications (25)
137.025-137.175 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile-satellite (space-to-Earth) 5.208A 5.209 Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208			137.025-137.175 SPACE OPERATION (space-to-Ear OLOGICAL-SATELLITE (space-to SPACE RESEARCH (space-to-Earth) Mobilesatellite (space-lo-Earth) US319 US320 5.208		
137.175-137.825 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.209 SPACE RESEARCH (space-to-Earth) Fixed			137.175-137.825 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US319 US320 SPACE RESEARCH (space-to-Earth)		

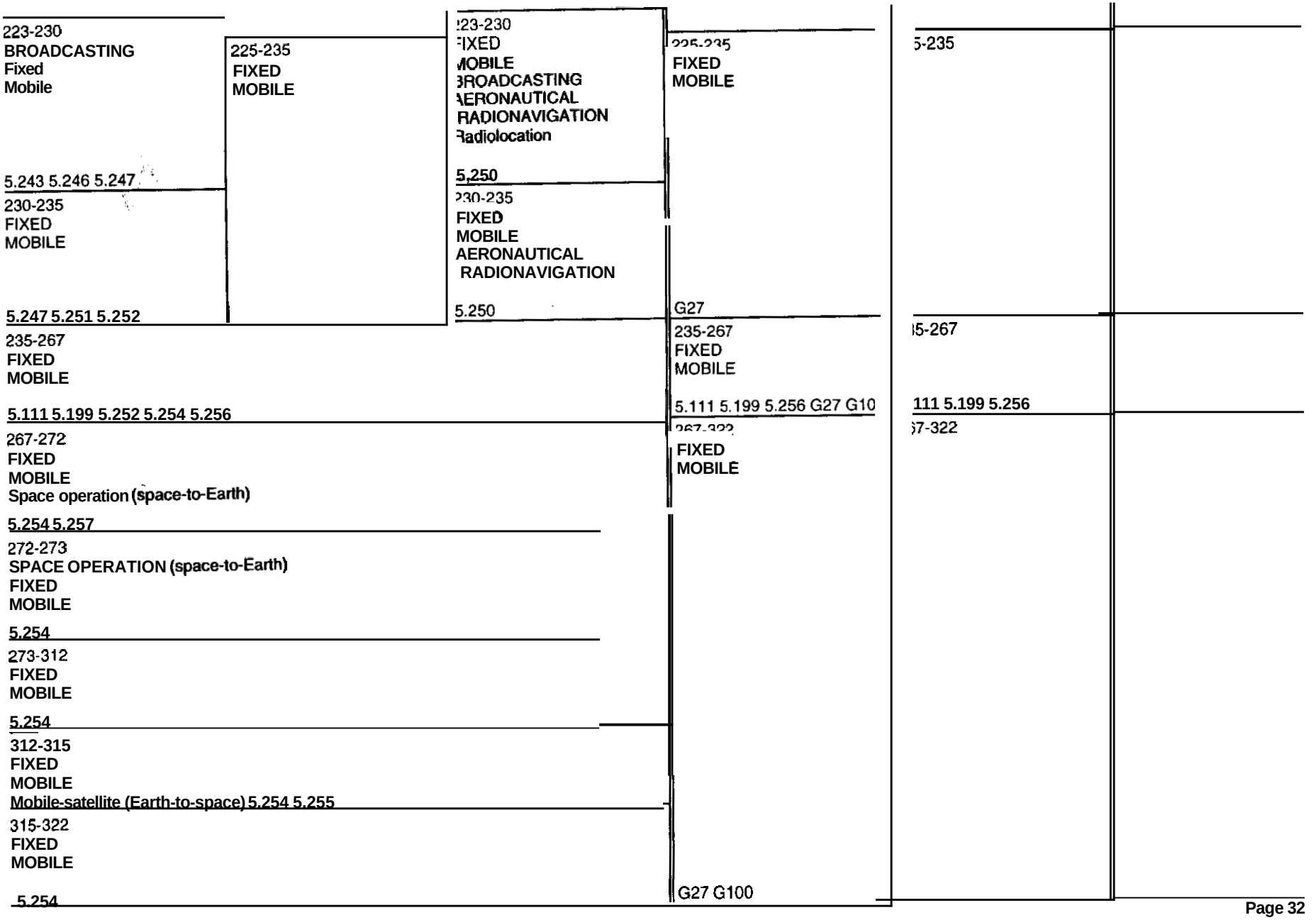

Mobile except aeronautical mobile (R)
5.204 5.205 5.206 5.207 5.208
137.825-138
SPACE OPERATION (space-to-Earth)
METEOROLOGICAL-SATELLITE(space-to-Earlh)
SPACE RESEARCH (space-to-Earth)
Fixed
Mobile-satellite (space-to-Earth)5.208A 5.209
Mobile except aeronautical mobile (R)
5.204 5.205 5.206 5.207 5.20(
138-143.6
AERONAUTICAL MOBILE
(OR)
5.210 5.211 5.212 5.214
138-143.6
FIXED
MOBILE
RADIOLOCATION
Space research
(space-to-Earth)
138-143.6
FIXED
MOBILE
Space research
(space-to-Earth)
5.207 5.213
143.6-143.65
AERONAUTICAL MOBILE
(OR)
SPACE RESEARCH
(space-to-Earlh)
5.211 5.212 5.214
143.6-143.65
FIXED
MOBILE
RADIOLOCATION
SPACE RESEARCH
(space-to-Earth)
143.6-143.65
FIXED
MOBILE
SPACERESEARCH
(space-to-Earth)
5.207 5.213
143.65-144
AERONAUTICAL MOBILE
(OR)
5.210 5.211 5.212 5.214
143.65-144
FIXED
MOBILE
RADIOLOCATION
Space research
(space-to-Earth)
143 65-144
FIXED
MOBILE
Space research
(space-to-Earlh)
5.207 5.213
144-146
AMATEUR
AMATEUR-SATELLITE
146-148
FIXED
MOBILE except aeronautical
mobile (R)
146-148
AMATEUR
146-148
AMATEUR
FIXED
MOBILE
:08
7.825-138
'ACE OPERATION (space-to-Earth)
:TEOROLOGICAL-SATELLITE (space-to-Earth)
'ACE RESEARCH (space-to-Earth)
)bile-satellite (space-to-Earth) US319 US320
208
8-144
XED
OBILE
38-144
i30
44-148
144-146
Amateur (97)
146-148
AMATEUR

148-162.0125 MHz (VHF)

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
148-149.9 FIXED MOBILE except aeronautical mobile (R) MOBILE-SATELLITE (Earth-to-space) 5.209 5.218 5.219 5.221	148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-Space) 5.209 5.218 5.219 5.221		148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) US319 US320 US323 US325 5.218 5.219 G30	148-149.9 MOBILE-SATELLITE (Earth-to-space) US319 ~~US320 US323 US325~~ 5.218 5.219	Satellite Communications (25)
149.9-150.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.224A RADIONAVIGATION-SATELLITE 5.224B 5.220 5.222 5.223			149.9-150.05 MOBILE-SATELLITE (Earth-to-space) US319 US320 RADIONAVIGATION-SATELLITE 5.223		
150.05-153 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149	150.05-156.7625 FIXED MOBILE		150.05-150.8 FIXED MOBILE US216 G30	150.05-150.8 US216	
			150.8-152.855 US216	150.8-152.855 FIXED AND MOBILE NG112 US216 NG4 NG51 NG124	Public Mobile (22) Private Land Mobile (90) Personal Radio (95)
153-154 FIXED MOBILE except aeronautical mobile (R) Meteorological aids			152.855-154	152.855-154 LAND MOBILE NG4 NG124	Auxiliary Broadcasting (74) Private Land Mobile (90)
154-156.7625 FIXED MOBILE except aeronautical mobile (R) 5.226 5.227			154-156.2475 5.226	154-156.2475 LAND MOBILE NG112 5.226 NG117 NG124 NG148	Maritime (80) Private Land Mobile (90) Personal Radio (95)
	5.225 5.226 5.227		156.2475-157.0375	156.2475-157.0375 MARITIME MOBILE	Aviation (87)

156.7625-156.8375 MARITIME MOBILE (distress and calling) 5,111 5.226		5.226 5.227 US77 US106 US107 US266	5.226 5.227 US77 US106 US107 US266 NG117	
156.8375-174 FIXED MOBILE except aeronautical mobile	56.8375-174 IXED IOBILE	157.0375-157.1875 5.226 US214 US266 G109	157.0375-157.1875 5.226 US214 US266	
		157.1875-157.45 5.226 US223 US266	157.1875-157.45 LAND MOBILE MARITIME MOBILE 5.226 US223 US266 NG111	Maritime (80)
		157.45-161.575 5.226 US266	157.45-161.575 FIXED LAND MOBILE 5.226 US266 NG6 NG28 NG70 NG111 NG112 NG124 NG148 NG155	Public Mobile (22) Maritime (80) Private Land Mobile (90)
		161.575-161.625 5.226 US77	161.575-161.625 MARITIME MOBILE 5.226 US77 NG6 NG17	Public Mobile (22) Maritime (80)
		161.625-161.775 5.226	161.625-161.775 5.226 NG6	Public Mobile (22) Auxiliary Broadcasting (74)
		161.775-162.0125 5.226 US266	161,775-162.0125 LAND MOBILE MARITIME MOBILE 5.226 US266 NG6	Public Mobile (22) Maritime (80) Private Land Mobile (90)
5.226 5.229	i.226 5.230 5.231 5.232	See next page for 162.0125-174 MHz		See next page for 162.0125-174 MHz

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
See previous page lor 156.8375-174 MHz			162.0125-173.2 FIXED US13 MOBILE 5.226 US8 US11 US216 US223 US300 US312 G5	162.0125-173.2 5.226 US8 US11 US13 US216 US223 US300 US312	Auxiliary Broadcasting (74) Private Land Mobile (90)
			173.2-173.4	173.2-173.4 FIXED Land mobile	Private Land Mobile (90)
			173.4-174 FIXED MOBILE G5	173.4-174	
174-223 BROADCASTING	174-216 BROADCASTING Fixed Mobile 5.234	174-223 FIXED MOBILE BROADCASTING	174-216	174-216 BROADCASTING NG115 NG128 NG149	Broadcast Radio (TV) (73) Auxiliary Broadcasting (74)
	216-220 FIXED MARITIME MOBILE Radiolocation 5.241 5.242		216-220 Fixed Mobile Radiolocation 5.241 G2 us210 us229	216-220 FIXED MOBILE except aeronautical mobile US210 US229 NG152 NG173	Maritime (80) Private Land Mobile (90) Personal Radio (95) Amateur (97)
	220-225 AMATEUR FIXED MOBILE Radiolocation 5.241		220-222 FIXED LAND MOBILE Radiolocation 5.241 G2 US335	220-222 FIXED LAND MOBILE us335	Private Land Mobile (90)
5.235 5.237 5.243		5.233 5.238 5.240 5.245	222-225 Radiolocation 5.241 G2		


223-230
BROADCASTING
Fixed
Mobile
225-235
FIXED
MOBILE
:23-230
FIXED
MOBILE
BROADCASTING
AERONAUTICAL
RADIONAVIGATION
Radiolocation
225-235
FIXED
MOBILE
5-235
5.243 5.246 5.247
5,250
230-235
FIXED
MOBILE
AERONAUTICAL
RADIONAVIGATION
230-235
FIXED
MOBILE
AERONAUTICAL
RADIONAVIGATION
5.247 5.251 5.252
5.250
G27
235-267
FIXED
MOBILE
235-267
FIXED
MOBILE
5.111 5.199 5.252 5.254 5.256
5.111 5.199 5.256 G27 G10
111 5.199 5.256
267-272
FIXED
MOBILE
Space operation (space-to-Earth)
FIXED
MOBILE
7-322
5.254 5.257
272-273
SPACE OPERATION (space-to-Earth)
FIXED
MOBILE
5.254
273-312
FIXED
MOBILE
5.254
312-315
FIXED
MOBILE
Mobile-satellite (Earth-to-space) 5.254 5.255
315-322
FIXED
MOBILE
5.254
G27 G100

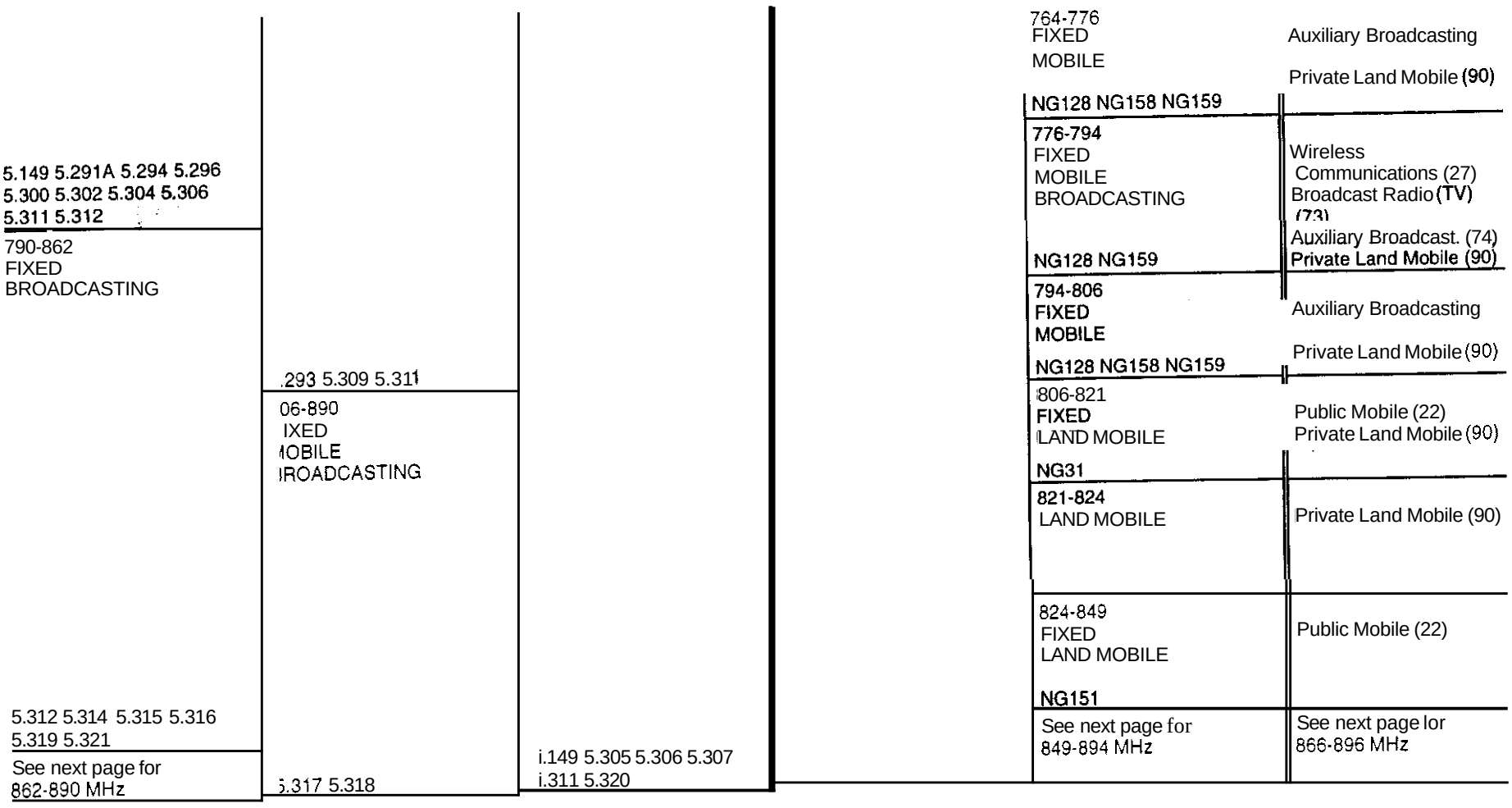
International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
322-328.6 FIXED MOBILE RADIO ASTRONOMY 5.149			322-328.6 FIXED MOBILE US342 G27	322-328.6 US342	
328.6-335.4 AERONAUTICAL RADIONAVIGATION 5.258 5.259			328.6-335.4 AERONAUTICAL RADIONAVIGATION 5.258		
335.4-387 FIXED MOBILE 5.254			335.4-399.9 FIXED MOBILE	335.4-399.9	
387-390 FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.254 5.255					
390-399.9 FIXED MOBILE 5.254			G27 G100		
399.9-400.05 MOBILE-SATELLITE (Earlh-lo-space) 5.209 5.224A RADIONAVIGATION-SATELLITE 5.222 5.224B 5 260 5.220			399.9-400.05 MOBILE-SATELLITE (Earth-to-space) US319 US320 RADIONAVIGATION-SATELLITE 5.260		
400.05-400.15 STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) 5.261 5.262			400.05-400.15 STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz)		
400.15-401 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.209 SPACE RESEARCH (space-to-Earth) 5.263 Space operation (space-to-Earth)			400.15-401 METEOROLOGICAL AIDS (radiosonde) US70 METEOROLOGICAL-SAT-ELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) US319 US320 US324	400.15-401 METEOROLOGICAL AIDS (radiosonde) US70 MOBILE-SATELLITE (space-to-Earth) US319 US320 US324 SPACE RESEARCH (space-to-Earth) 5.263	Satellite Communications (25)

	SPACERESEARCH (space-to-Earth) 5.263 Space operation (space-to-Earth)	Space operation (space-lo-Earth)	
5.262 5.264	5.264	5.264	
401-402 METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile	401-402 METEOROLOGICAL AIDS (radiosonde) US70 SPACE OPERATION (spaceto-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SAT-ELLITE (Earth-lo-space) USxxx	401-402 METEOROLOGICAL AIDS (radiosonde) US70 SPACE OPERATION (space-to-Earth) Earth exploration-satellite (Earth-to-space) Meteorological-satellite (Earth-to-space) USxxx	
402-403 METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE(Earth-to-space) Fixed Mobile except aeronautical mobile	402-403 METEOROLOGICAL AIDS (radiosonde) US70 EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SAT-ELLITE (Earth-to-space) US345 USxxx	402-403 METEOROLOGICAL AIDS (radiosonde) US70 Earth exploration-satellite (Earth-to-space) Meteorological-satellite (Earth-to-space) US345 USxxx	Personal Radio (95)
403-406 METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile	403-406 METEOROLOGICAL AIDS (radiosonde) US70 US345 G6	403-406 METEOROLOGICAL AIDS (radiosonde) US70 US345	
406-406.1 MOBILE-SATELLITE (Earth-to-space) 5.266 5.267	406-406.1 MOBILE-SATELLITE (Earth-to-space) 5.266 5.267		
406.1-410 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149	406.1-410 FIXED US13 MOBILE RADIO ASTRONOMY US74 US117 G5 G6	406.1-410 RADIO ASTRONOMY US74 US13 US117	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	sderal Government	Non-Federal Government	
410-420 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.268			10-420 IXED US13 OBILE PACERESEARCH space-to-space) 5.268 5	410-420 US13	Private Land Mobile (90)
420-430 FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271			20-450 ADIOLOCATION US217 IS228 G2 G129	420-450 Amateur US7 NG135	Private Land Mobile (90) Amateur (97)
430-440 AMATEUR RADIOLOCATION 5.138 5.271 5.272 5.273 5.274 5.275 5.276 5.277 5.280 5.281 5.282 5.283	430-440 RADIOLOCATION Amateur 5.271 5.276 5.277 5.278 5.279 5.281 5.282				
440-450 FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 5.284 5.285 5.286			.286 US7 US87 US230 G8	5.282 5.286 US87 US217 US228 US230	
450-455 FIXED MOBILE			50-454 .286 US87	450-454 LAND MOBILE 5.286 US87 NG112 NG124	Auxiliary Broadcasting (74) Private Land Mobile (90)
			54-456	454-455 FIXED LAND MOBILE NG12 NG112 NG148	Public Mobile (22) Maritime (80)
455-456 FIXED MOBILE 5.209 5.271 5.286A 5.286B 5.286C 5.286E	455-456 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209	455-456 FIXED MOBILE 5.209 5.271 5.286A 5.286B 5.286C 5.286E		455-456 LAND MOBILE	Auxiliary Broadcasting (74)

456-459 FIXED MOBILE			6-460	456-460 FIXED LAND MOBILE	Public Mobile (22) Maritime (80) Private Land Mobile (90)
459-460 FIXED MOBILE 5.209 5.271 5.286A 5.286B 5.286C 5.286E	459-460 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.286A 5.286B 5.286C 5.209	459-460 FIXED MOBILE 5.209 5.271 5.286A 5.286B 5.286C 5.286E	287 5.288	5.287 5.288 NG112 NG124 NG148	
FIXED MOBILE Meteorological-satellite (space-to-Earth)			50-470 eteorological-satellite ;pace-to-Earth)	460-462.5375 FIXED LAND MOBILE 5.289 US201 US209 NG124	Private Land Mobile (90)
				462.5375-462.7375 LAND MOBILE 5.289 US201	Personal Radio (95)
				462.7375-467.5375 FIXED LAND MOBILE 5.287 5.289 US201 US209 US216 NG124	Private Land Mobile (90)
				467.5375-467.7375 LAND MOBILE 5.287 5.289 US201	Personal Radio (95)
				467.7375-470 FIXED LAND MOBILE	Private Land Mobile (90)
			5.287 5.288 5.289 US201 US209 US216	5.288 5.289 US201 US216 NG124	

Region 1	Region 2	Region 3	United States Table		FCC Rule Part(s)
			Federal Government	Non-Federal Government	
470-790 BROADCASTING	470-512 BROADCASTING Fixed Mobile 5.292 5.293	470-585 FIXED MOBILE BROADCASTING	470-608	470-512 BROADCASTING NG128 NG149 FIXED NG127 LAND MOBILE NG66 NG114	Public Mobile (22) Broadcast Radio (TV) (73) Auxiliary Broadcasting (74) Private Land Mobile (90)
	512-608 BROADCASTING 5.297	5.291 5.298 585-610 FIXED MOBILE BROADCASTING RADIONAVIGATION		512-608 BROADCASTING NG128 NG149	Broadcast Radio (TV) (73) Auxiliary Broadcasting (74)
	608-614 RADIO ASTRONOMY Mobile satellite except aeronautical mobile-satellite (Earth-to-space)	5.149 5.305 5.306 5.307 610-890 FIXED MOBILE 5.317A BROADCASTING	608-614 RADIO ASTRONOMY US74 AND MOBILE US350		Personal (95)
	614-806 BROADCASTING Fixed Mobile		614-890	614-698 BROADCASTING NG128 NG149	Broadcast Radio (TV) (73) Auxiliaty Broadcast. (74)
				698-746 BROADCASTING NG128 NG159 FIXED MOBILE	Wireless Communications (27) Broadcast Radio (TV) (73) Auxiliaty Broadcast. (74)
				746-764 FIXED MOBILE BROADCASTING NG128 NG159	Wireless Communications (27) Broadcast Radio (TV) (73) Auxiliary Broadcasting (74) Private Land Mobile (90)


5.149 5.291A 5.294 5.296
5.300 5.302 5.304 5.306
5.311 5.312
790-862
FIXED
BROADCASTING
.293 5.309 5.311
06-890
IXED
IOBILE
IROADCASTING
5.312 5.314 5.315 5.316
5.319 5.321
See next page for
862-890 MHz
5.317 5.318
i.149 5.305 5.306 5.307
i.311 5.320
764-776
FIXED
MOBILE
Auxiliary Broadcasting
Private Land Mobile (90)
NG128 NG158 NG159
776-794
FIXED
MOBILE
BROADCASTING
Wireless
Communications (27)
Broadcast Radio (TV)
(73)
Auxiliary Broadcast. (74)
Private Land Mobile (90)
NG128 NG159
794-806
FIXED
MOBILE
Auxiliary Broadcasting
Private Land Mobile (90)
NG128 NG158 NG159
806-821
FIXED
LAND MOBILE
Public Mobile (22)
Private Land Mobile (90)
NG31
821-824
LAND MOBILE
Private Land Mobile (90)
824-849
FIXED
LAND MOBILE
Public Mobile (22)
NG151
See next page for
849-894 MHz
See next page lor
866-896 MHz

International Table			United States Table		FCC Rule Part(s)
Region 1	egion 2	egion 3	deral Government	Non-Federal Government	
See previous pages for 470-862 MHz	ee previous pages for 14-890 MHz	ee previous pages for 35-890 MHz	e previous pages lor 4-890 MHz	See previous pages for 614-849 MHz	See previous pages lor 614-849 MHz
				849-851 AERONAUTICAL MOBILE	Public Mobile (22)
862-890 FIXED MOBILE except aeronautical mobile BROADCASTING 5.322 5.319 5.323				851-866 FIXED LAND MOBILE NG31	Public Mobile (22) Private Land Mobile (90)
				~~866-869~~ ~~LAND MOBILE~~	~~Private Land Mobile (90)~~
				869-894 FIXED LAND MOBILE US116 US268 NG151	Public Mobile (22)
890-942 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 Radiolocation	190-902 FIXED MOBILE except aeronautic2 mobile 5.317A Radiolocation 5.318 5.325	90-94 IXED MOBILE 5.317A BROADCASTIN Radiolocation	90-902 JS116 US268 G2	894-896 AERONAUTICAL MOBILE US116 US268	
				896-901 FIXED LAND MOBILE US116 US268	Private Land Mobile (90)
				901-902 FIXED MOBILE US116 US268	Personal Communications (24)

	!2-928 XED nateur obile except aeronautical iobile 5.325A adiolocation 150 5.325 5.326	902-928 RADIOLOCATION G59 5.150 US215 US218 US267 US275 G11	902-928 5.150 US215 US218 US267 US275	SM Equipment (18) 'rivate Land Mobile (90) rmateur (97)
	28-942 XED OBILE except aeronautica nobile 5.317A adiolocation	!8-932	928-929 FIXED US116 US215 US268 NG120	Public Mobile (22) 'rivate Land Mobile (90) Fixed Microwave (101)
			929-930 FIXED LAND MOBILE US116 US215 US268	Jrivate Land Mobile (90)
			930-931 FIXED MOBILE US116 US215 US268	Personal Communications (24)
			931-932 FIXED LAND MOBILE	Public Mobile (22)
		932-935 FIXED US215 US268 G2	932-935 FIXED US215 US266 NG120	Public Mobile (22) Fixed Microwave (101)
		935-940 US116 US215 US268 G2	935-940 FIXED LAND MOBILE US116 US215 US268	Private Land Mobile (90)
		940-941 US116 US268 G2	940-941 FIXED MOBILE US116 US268	Personal Communications (24)
5.323	5.325			See next page lor 941-944 MHz

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
See previous page for 890-942 MHz	See previous page lor 928-942 MHz	See previous page lor 890-942 MHz	941-944 FIXED US268 US301 US302 G2	941-944 FIXED US268 US301 US302 NG120	Public Mobile (22) Fixed Microwave (101)
942-960 FIXED MOBiLE except aeronautical mobile 5.317A BROADCASTING 5.322 5.323	942-960 FIXED MOBILE 5.317A	942-960 FIXED MOBILE 5.317A BROADCASTING 5.320	944-960	944-960 FIXED NG120	Public Mobile (22) Auxiliary Broadcast. (74) Fixed Microwave (101)
960-1215 AERONAUTICAL RADIONAVIGATION 5.328 5.328A			960-1215 AERONAUTICAL RADIONAVIGATION 5.328 US224 USyyy		Aviation (87)
1215-1240 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.329 5.329A SPACE RESEARCH (active) 5.330 5.331 5.332			1215-1240 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G56 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) SPACE RESEARCH (active) 5.332	1215-1240 Earth exploration-satellite (active) Space research (active)	
1240-1260 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.329 5.329A SPACE RESEARCH (active) Amateur 5.330 5.331 5.332 5.334 5.335			1240-1300 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G56 SPACE RESEARCH (active)	1240-1300 Earth exploration-satellite (active) Space research (active) Amateur	Amateur (97)
1260-1300 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.330 5.331 5.334 5.335 5.335A			5.332 5.334 5.335	5.282 5.334	

1300-1350 AERONAUTICAL RADIONAVIGATION 5.337 RADIOLOCATION RADIONAVIGATION-SATELLITE (Earth-to-space) 5.149 S5337A		300.1350 AERONAUTICAL RADIO- NAVIGATION 5.337 Radiolocation G2 US342	1300-1350 AERONAUTICAL RADIO- NAVIGATION 5.337 US342	Aviation (87)
1350-1400 FIXED MOBILE RADIOLOCATION	350-1400 ADIOLOCATION	350-1390 FIXED MOBILE RADIOLOCATION G2 i.334 5.339 US311 US342 327 G114	1350-1390 5.334 5.339 US311 US342	
		1390-1395 5.339 US311 US342 US351	1390-1392 FIXED MOBILE except aeronautical mobile FIXED-SATELLITE (Earth-tospace) US368 5.339 US311 US342 US351 1392-1395 FIXED MOBILE except aeronautical mobile 5.339 US311 US342 US351	Wireless Communications (27)
5.149 5.338 5.339	.149 5.334 5.339	1395-1400 LAND MOBILE US350 5.339 US311 US342 US351		Personal (95)
1400-1427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341		1400-1427 EARTH EXPLORATION-SATELLITE(passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5.341 US246		

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
1427-1429 SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.341			1427-1429.5 LAND MOBILE US350 5.341 US352	1427-1429.5 LAND MOBILE Fixed (telemetry) 5.341 US350 US352	Private Land Mobile (90) Personal (95)
1429-1452 FIXED MOBILE except aeronautical mobile 5.341 5.342	1429-1452 FIXED MOBILE 5.343 5.341		1429.5-1432 5.341 US350 US352	1429.5-1430 FIXED (telemetry) LAND MOBILE (telemetry) 5.341 US350 US352 1430-1432 FIXED (telemetry) LAND MOBILE (telemetry) FIXED-SATELLITE (space-to-Earth) US368 5.341 US350 US352	
			1432-1435 5.341 US361	1432-1435 FIXED MOBILE except aeronautical mobile 5.341 US361	Wireless Communications (27)
1452-1492 FIXED MOBILE except aeronautical mobile BROADCASTING 5.345 5.347 BROADCASTING-SATELLITE 5.345 5.347 5.341 5.342	1452-1492 FIXED MOBILE 5.343 BROADCASTING 5.345 5.347 BROADCASTING-SATELLITE 5.345 5.347 5.341 5.344		1435-1525 MOBILE (aeronautical telemetry) 5.341 US78		Aviation (87)
1492-1525 FIXED MOBILE except aeronautical mobile 5.341 5.342	1492-1525 FIXED MOBILE 5.343 MOBILE-SATELLITE (space-to-Earth) 5.348A 5.341 5.344 5.348	1492-1525 FIXED MOBILE 5.341 5.348A			

1525-1530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.351A Earth exploration-satellite Mobile except aeronautical mobile 5.349 5.341 5.342 5.350 5.351 5.352A 5.354	1525-1530 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.351A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.351 5.354	1525-1530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.351A Earth exploration-satellite Mobile 5.349 5.341 5.351 5.352A 5.354	1525-1535 MOBILE-SATELLITE hate-to-Earth) US315 Mobile (aeronautical telemetry) US78	Satellite Communications (25) Maritime (80) Aviation (87)
SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space- to-Earth) 5.351A 5.353A Eanh exploration-satellite Fixed Mobile except aeronautical mobile 5,341 5.342 5.351 5.354	SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.351A 5.353A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.351 5.354		5.341 5.351	
1535-1559 MOBILE-SATELLITE (space-to-Earth) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.356 5.357 5.357A 5.359 5.362A			1535-1559 MOBILE-SATELLITE (space-to-Earth) US308 US309 5.341 5.351 5.356	Satellite Communications (25) Maritime (80) Aviation (87)
1559-1610 \L RADIONAVIGATION TION-SATELLITE (spac Ea th) (s t 5.329A 5.341 2E 3 C 3			1559-1610 Al RADIONAVIGATION Ea th) R (s 5.341 US2 30 US3	Aviation (87)

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1610-1670MHz (UHF)

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION 5.341 5.355 5.359 5.363 5 364 5.366 5.367 5.368 5.369 5.371 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space)5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to- space) 5.341 5.364 5.366 5.367 5.368 5.370 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Radiodetermination-Satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	1610-1610.6 MOBILE-SATELLITE (Earth-to-space) US319 AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE(Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.372 US208		Satellite Communications (25) Aviation (87)
1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION 5.149 5.341 5.355 5.359 5.363 5.364 5.366 5.367 5.368 5.369 5.371 6.372	1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space)5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to- space) 5.149 5.341 5.364 5.366 5.367 5.368 5.370 5.372	1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	1610.6-1613.8 MOBILE-SATELLITE (Earth-to-space) US319 RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE(Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.372 US208 US342		
1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.341 5.355 5.359 5.363 5.364 5.365 5.366 5.367 5.368 5.369 5.371 5.372	1613.8-1626.5 'AOBILE-SATELLITE (Earth-to-space) 5.351A \ERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to- space) Aobile-satellite (space-to- Earth) i.341 5.364 5.365 5.366 i.367 5.368 5.370 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to- Earth) Radiodetermination- satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.372	1613.8-1626.5 MOBILE-SATELLITE (Earth-to-space) US319 AERONAUTICAL RADIONAVIGATION US260 RADIODETERMINATION-SATELLITE(Earth-to-space) Mobile-satellite (space-to-Earth) 5.341 5.364 5.365 5.366 5.367 5.368 5.372 US208		

1626.5-1660 MOBILE-SATELLITE (Earth-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.362A 5.374 5.375 5.376	1626.5-1660 MOBILE-SATELLITE (Earth-to-space) US308 US309 us315 5.341 5.351 5.375	Satellite Communicalions (25) Maritime (80) Aviation (87)
1660-1660.5 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY 5.149 5.341 5.357 5.354 5.362A 5.376A	1660-1660.5 MOBILE-SATELLITE (Earth-to-space) US308 US309 RADIO ASTRONOMY 5.341 5.351 US342	Satellite Communications (25) Aviation (87)
1660.5-1668.4 RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379 5.379A	1660.5-1668.4 RADIO ASTRONOMY US74 SPACE RESEARCH (passive) 5.341 US246	
1668.4-1670 METEOROLOGICAL AIDS FIXED MOBILE excepl aeronautical mobile RADIO ASTRONOMY 5.149 5.341	1668.4-1670 METEOROLOGICAL AIDS (radiosonde) RADIO ASTRONOMY US74 5.341 US99 US342	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
1670-1675 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE 5.380 5.341			1670-1675 5 341 US211 US362	1670-1675 FIXED MOBILE except aeronautical mobile 5 341 US211 US362	Wireless Communications (27)
1675-1690 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SAT-ELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341	1675-1690 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SAT-ELLITE (space-to-Earth) MOBILE except aeronautlcal mobile MOBILE-SATELLITE (Earth-to-space) 5.341 5.377	1675-1690 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SAT-ELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341	1675-1700 METEOROLOGICAL AIDS (radiosonde) METEOROLOGICAL-SATELLITE (space-to-Earth)		
1690-1700 METEOROLOGICAL AIDS METEOROLOGICAL-SAT-ELLITE (space-lo-Earth) Fixed Mobile except aeronautlcal mobile 5.289 5.341 5.382	1690-1700 METEOROLOGICAL AIDS METEOROLOGICAL-SAT-ELLITE (space-to-Earth) MOBILE-SATELLITE (Earth-to-space) 5.269 5.341 5.377 5.381	1690-1700 METEOROLOGICAL AIDS METEOROLOGICAL-SAT-ELLITE (space-lo-Earth) 5.289 5.341 5.381	 5.289 5.341 US211		
1700-1710 FIXED METEOROLOGICAL-SAT-ELLITE (space-lo-Earth) MOBILE except aeronautical mobile 5.289 5.341	1700-1710 FIXED METEOROLOGICAL-SAT-ELLITE (space-to-Earth) MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space) 5.289 5.341 5.377	1700-1710 FIXED METEOROLOGICAL-SAT-ELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.269 5.341 5 364	1700-1710 FIXED G118 METEOROLOGICAL-SAT-ELLITE (space-to-Earth) 5.289 5 341	1700-1710 METEOROLOGICAL-SAT-ELLITE (space-to-Earth) Fixed 5.289 5.341	
1710-1930 FIXED MOBILE 5.360 5.384A 5.388A			1710-1755 FIXED MOBILE 5.341 US311	1710-1755 5.341 US311	

5. 195			55-1850 KED OBILE 2	55-1850	
1930-19 0 FIXED MOBILE 5.388A 5.388	1930-1970 FIXED MOBILE 5 388A Mobile-satellite (Earth-to-space) 5.388	1930-1970 FIXED MOBILE 5 388A 5.388	50-2025	Eo-1990 XED OBILE	F Devices (15) ersonal Communications (24) ixed Microwave (101)
1970-1980 FIXED MOBILE 5.388A 5.388					
1980-2010 FIXED				990-2025 IOBILE-SATELLITE :Earth-to-space)	Satellite Communications (25)
2010-2025 FIXED MOBILE 5.388A 5.388	2010-2025 FIXED MOBiLE MOBILE-SATELLITE (Earth-to-space) 5.388 5.389C 5.389D 5.389E 5.390	2010-2025 FIXED MOBILE 5.388A 5.388		NG15	
2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-to-space) 5.392			2025-2110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION- SATELLITE (Earth-to- space) (space-to-space) SPACE RESEARCH (Earth to-space) (space-to-space) 5.391 5.392 US90 US222 US346 US347	2025-2110 FIXED NG118 MOBILE 5.391 5.392 US90 US222 US346 US347	TV Auxiliary Broadcasting (74F) Cable TV Relay (78) Local TV Transmission (101J)

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
2110-2120 FIXED MOBILE 5.388A SPACE RESEARCH (deep space) (Earth-lo-space)			110-2120 S252	110-2150 FIXED MOBILE US252 NG153	Public Mobile (22) Fixed Microwave (101)
2120-2160 FIXED MOBILE 5.388A 5.388	2120-2160 FIXED MOBILE 5.388A Mobile-satellite (space-to-Earth) 5.388	2120-2160 FIXED MOBILE 5.388A 5.388	120-2200	2150-2160 FIXED	Domestic Public Fixed (21) Fixed Microwave (101)
2160-2170 FIXED MOBILE 5.388A 5.388 5.392A	2160-2170 FIXED MOBILE 5.388A MOBILE-SATELLITE (space-to-Earth) 5.388 5.389C 5.389D 5.389E 5.390	2160-2170 FIXED MOBILE 5.388A 5.388		2160-2165 FIXED MOBILE NG153 2165-2200 MOBILE-SATELLITE (space-to-Earth) NG168	Domestic Public Fixed (21) Public Mobile (22) Fixed Microwave (101) Satellite Communications (25)
FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space)			2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED (line-of-sight only)	2200-2290	

		MOBILE (line-of-sight only including aeronautical telemetry, but excluding flight testing of manned aircralt) SPACE RESEARCH (space-to-Earth) (space-to-space)		
5 392		5.392 US303	US303	
2290-2300 FIXED MOBILE except aeronautlcal mobile SPACE RESEARCH (deep space) (space-to-Earth)		2290-2300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (spaceto-Earth)	2290-2300 SPACE RESEARCH (deep space) (space-to-Earth)	
2300-2450 FIXED MOBILE Amateur Radiolocation	2300-2450 FIXED MOBILE RADIOLOCATION Amateur	2300-2305	2300-2305 Amateur	Amateur (97) Note: 2300-2305 MHz became non-Federal Government exclusive spectrum in August 1995
		G123		
		2305-2310	2305-2310 FIXED MOBILE except aeronautical mobile RADIOLOCATION Amateur	Wireless Communications (27) Amateur (97)
		US338 G123	US338	
		2310-2345 Fixed Mobile US328 US339 Radiolocation G2 G120	2310-2320 FIXED MOBILE US339 RADIOLOCATION BROADCASTING-SATELLITE 5.396 US327	Wireless Communications (27) Amateur (97)
			2320-2345 BROADCASTING-SATELLITE 5.396 US327	Satellite Communications (25) Aviation (87)
		US327	US328	
		See next page for 2345-2450 MHz		See next page for 2345-2450 MHz
5.150 5.282 5.395	5.150 5,282 5.393 5.394 5.396			

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
See previous page for 2300-2450 MHz			2345-2360 Fixed Mobile US339 RadiolocationG2 G120 US327	2345-2360 FIXED MOBILE US339 RADIOLOCATION BROADCASTING- SATELLITE 5.396 US327	Wireless Communications (27) Aviation (87)
			2360-2385 MOBILE US276 RADIOLOCATION G2 G120 Fixed	2360-2385 MOBILE US276	Aviation (87)
			2385-2390 US363	2385-2390 FIXED MOBILE NG174 US363	Wireless Communications (27)
			2390-2400 G122	2390-2400 AMATEUR	RF Devices (15) Amateur (97)
			2400-2402 5.150 G123	2400-2402 Amateur 5.150 5.282	ISM Equipment (18) Amateur (97)
			2402-2417 5.150 G122	2402-2417 AMATEUR 5.150 5.282	RF Devices (15) ISM Equipment (18) Amateur (97)
			2417-2450 RadiolocationG2 5.150 G124	2417-2450 Amateur 5.150 5.282	ISM Equipment (18) Amateur (97)
2450-2483.5 FIXED MOBILE Radiolocation 5.150 5.397	2450-2483.5 FIXED MOBILE RADIOLOCATION 5.150 5.394		2450-2483.5 5.150 US41	2450-2483.5 FIXED MOBILE Radiolocation 5.150 US41	ISM Equipment (18) Private Land Mobile (90) Fixed Microwave (101)

2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A Radiolocation 5.150 5.371 5.397 5.398 5.399 5.400 5.402	2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402	2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION Radiodetermination-satellite (space-to-Earth) 5.398 5.150 5.400 5.402	2483.5-2500 MOBILE-SATELLITE (space-to-Earth) US319 RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402 US41	2483.5-2500 MOBILE-SATELLITE (space-to-Earth) US319 RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402 US41 NG147	ISM Equipment (18) Satellite Communications (25) Private Land Mobile (90) Fixed Microwave (101)
2500-2520 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space-to-Earth) 5.403 5.351A 5.405 5.407 5.412 5.414	2500-2520 FIXED 5.409 5.411 FIXED-SATELLITE (soace-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space-to-Earth) 5.403 5.351A 5.404 5.407 5.414 5.415A		2500-2655	2500-2655 FIXED US205 MOBILE except aeronautical mobile	Domestic Public Fixed (21) Auxiliary Broadcasting (74)
2520-2655 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.403 5.405 5.412 5.418 5.418B 5.418C	2520-2655 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.403 5.418B 5.418C	2520-2535 FIXED 5.409 5.411 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.403 5.415A 2535-2655 FIXED 5.409 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.418 5.418A 5.418B 5.418C	5.339 US205 US269	5.339 US269	

International Table			United S s Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	ederal Government	don-Federal Government	
2655-2670 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A BROADCASTING SATELLITE 5.413 5:416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.412 5.420	2655-2670 FIXED 5.409 5.411 FIXED-SATELLITE (Eanh-to-space) (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A 5.149 5.420	2655-2670 FIXED 5.409 5.411 FIXED-SATELLITE (Earth-to-space)5.415 MOBILE except aeronautica mobile 5.384A BROADCASTING-SATELLITE 5,413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.420	555-2690 arih exploration-satellite passive) adio astronomy pace research (passive)	655-2690 IXED US205 MOBILE except aeronautical mobile Earth exploration-satellite (passive) Radio astronomy Space research (passive)	Domestic Public Fixed (21) Auxiliary Broadcasting (74)
2670-2690 FIXED 5.409 5.410 5.411 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-tospace): Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.419 5.420	2670-2690 FIXED 5.409 5.411 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 6.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.419 5.420	2670-2690 FIXED 5.409 5.411 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautica mobile 5.384A MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.419 5.420 5.420A	US205 US269	JS269	
2690-2700 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.421 5.422			2690-2700 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
2700-2900 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423 5.424			2700-2900 AERONAUTICAL RADIO-NAVIGATION 5.337 METEOROLOGICAL AIDS RadiolocationG2 5.423 US18 G15	2700-2900 5.423 US18	

2900-3100 RADIONAVIGATION5.426 Radiolocation 5.425 5.427			900-3100 MARITIME RADIONAVIGATION Radiolocation G56 .427 US44 US316	2900-3100 MARITIME RADIONAVIGATION Radiolocation US44 5.5427 US316	Maritime (80) Private Land Mobile (90)
3100-3300 RADIOLOCATION Earth exploration-satellite (active) Space research (active)			100-3300 RADIOLOCATION G59 Earth exploration-satellite (active) ;pace research (active) JS342	3100-3300 Radiolocation Earth exploration-satellite (active) Space research (active) US342	Private Land Mobile (90)
3300-3400 RADIOLOCATION 5.149 5.429 5.430	3300-3400 RADIOLOCATION Amateur Fixed Mobile 5.149 5.430	3300-3400 RADIOLOCATION Amateur 5.149 5.429	1300-3500 RADIOLOCATION US108 G31 JS342	3300-3500 Amateur Radiolocation US108 US342 5.282	Private Land Mobile (90) Amateur (97)
3400-3600 FIXED FIXED-SATELLITE (space-to-Earth) Mobile Radiolocation 5.431	3400-3500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile Radiolocation 5.433 5.282 5.432		3500-3650 RADIOLOCATION G59 AERONAUTICAL RADIONAVIGATION (ground-based) GI 10 JS245	3500-3600 Radiolocation 3600-3650 FIXED-SATELLITE (space-to-Earth) US245 Radiolocaiion	Private Land Mobile (90)
3600-4200 FIXED FIXED-SATELLITE (space-to-Earth) Mobile	3500-3700 FIXED FIXED-SATELLITE (space-lo-Earth) MOBILE except aeronautical mobile Radiolocation 5.433 5.435		3650-3700 JS245 US348 US349	3650-3700 FIXED FIXED-SATELLITE (space-to-Earth)NG169 MOBILE except aeronautical mobile NG170 US245 US348 US349	
	See next page for 3700-4200 MHz		See next page for 3700-4200MHz	See next page for 3700-4200 MHz	See next page for 3700-4200 MHz

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Region 1	Region 2	Region 3	United States Table: Federal Government	United States Table: Non-Federal Government	CC Rule Part(s)
See previous page for 3600-4200 MHz	3700-4200 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile		700-4200	3700-4200 FIXED NG41 FIXED-SATELLITE (space-to-Earth)	International Fixed (23) Satellite Communications (25) Fixed Microwave (101)
			200-4400 AERONAUTICAL RADIONAVIGATION i.440 US261		Aviation (87)
			1400-4500 FIXED MOBILE	4400-4500	
4500-4800 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE			1500-4800 FIXED MOBILE US245	4500-4800 FIXED-SATELLITE (space-to-Earth) 5.441 US245	
4800-4990 FIXED MOBILE 5.442 Radio astronomy 5.149 5.339 5.443			4800-4940 4800-4940 FIXED MOBILE MOBILE US203 US342	4800-4940 4800-4940 US203 US342	
			4940-4990 5.339 US311 US342 G122	4940-4990 FIXED MOBILE except aeronautic: mobile 5.339 US311 US342	Private Land Mobile (90) Fixed Microwave (101)
4990-5000 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space research (passive)			US246		
5000-5150 AERONAUTICAL RADIONAVIGATION 5.367 5.443A 5.443B 5.444 5.444A			5000-5250 AERONAUTICAL RADIO-NAVIGATION US260	5000-5150 AERONAUTICAL RADIO-NAVIGATION US260 5.367 5.444A US211 US34 US370	Satellite Communications (25) Aviation (87)

5150-5250 AERONAUTICAL RADIONAVIGATION FIXED-SATELLITE (Earth-to-space) 5.447A 5.446 5.447 5.447B 5.447C	5.367 US211 US307 US? US370	5150-5250 AERONAUTICAL RADIO-NAVIGATION US260 FIXED-SATELLITE (Earth-to-space) 5.447A US344 5.447C US211 US307	
5250-5255 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.447D 5.448 5.448A	5250-5255 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH 5.447D	5250-5255 Earth exploration-satellite (active) Radiolocation Space research	
5255-5350 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.448 5.448A	5255-5350 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G SPACE RESEARCH (active)	5255-5350 Earth exploration-satellite (active) Radiolocation Space research (active)	
5350-5460 EARTH EXPLORATION-SATELLITE (active) 5.448B AERONAUTICAL RADIONAVIGATION 5.449 Radiolocation	5350-5460 EARTH EXPLORATION-SATELLITE (active) 5.4488 AERONAUTICAL RADIO-NAVIGATION 5.449 RADIOLOCATION G56	5350-5460 AERONAUTICAL RADIO-NAVIGATION 5.449 Earth exploration-satellite (active) Radiolocation	Aviation (87)
5460-5470 RADIONAVIGATION 5.449 Radiolocation	5460-5470 RADIONAVIGATION 5.449 Radiolocation G56 US49 US65	5460-5470 RADIONAVIGATION 5.449 Radiolocation US49 US65	
5470-5650 MARITIME RADIONAVIGATION Radiolocation 5.450 5.451 5.452	5470-5600 MARITIME RADIONAVIGATION Radiolocation G56 US50 US65 5600-5650 MARITIME RADIONAVIGATION METEOROLOGICAL AIDS Radiolocation US51 G56 5.452 US65	5470-5600 MARITIME RADIONAVIGATION Radiolocation US50 US65 5600-5650 MARITIME RADIONAVIGATION METEOROLOGICAL AIDS Radiolocation US51 5.452 US65	Maritime (80)

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5725-5830 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur 5.150 5.451 5.453 5.455 5.456	5725-5830 RADIOLOCATION Amateur 5.150 5.453 5.455			5.150 5.282	
5830-5850 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.451 5.453 5.455 5.456	5830-5850 RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.453 5.455			5830-5850 Amateur Amateur-satellite (space-to-Earth) 5.150	
5850-5925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.150	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Amateur Radiolocation 5.150	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation 5.150	.150 US245	5850-5925 FIXED-SATELLITE (Earth-to-space) US245 MOBILE NG160 Amateur 5.150	ISM Equipment (18) Private Land Mobile (90) Amateur (97)
5925-6700 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE			925-6425	5925-6425 FIXED NG41 FIXED-SATELLITE (Earth-to-space)	International Fixed (23) Satellite Communications (25) Fixed Microwave (101)
			425-6525 .440 5.458	6425-6525 FIXED-SATELLITE (Earth-to-space) MOBILE 5.440 5.458	Auxiliary Broadcasting (74) Cable TV Relay (78) Fixed Microwave (101)

	6525-6700 5.458 US342	6525-6700 FIXED FIXED-SATELLITE (Earth-to-space) 5.458 US342	Satellite Communications (25) Fixed Microwave (101)
5.149 5.440 5.458 6700-7075 FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE	6700-7125	6700-6875 FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 5.458 5.458A 5.458B	
		6875-7025 FIXED NG118 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE NG171 5.458 5.458A 5.458B	atellite Communications (25) uxiliary Broadcasting 74) :able TV Relay (78)
		7025-7075 FIXED NG118 FIXED-SATELLITE (Earth-to-space) NG172 MOBILE NG171 5.458 5.458A 5.458B	
MOBILE		FIXED NG118 MOBILE NG171	Auxiliary Broadcasting (74) :able TV Relay (78)
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	7125-7190 FIXED 5.458 US252 G116	7125-7190 5.458 US252	
	7190-7235 FIXED SPACERESEARCH (Earth-to-space) 5.458	7190-7250	
	7235-7250 FIXED 5.458	5.458	
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7300-7450 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE exceot aeronautical mobile 5.461			7300-7450 FIXED FIXED-SATELLITE (space-to-Earth) Mobile-satellite (space-to-Earth) G117		
7450-7550 FIXED FIXED-SATELLITE (soace-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.461A			7450-7550 FIXED FIXED-SATELLITE (space-lo-Earth) METEOROLOGICAL-SAT- ELLITE (space-to-Earth) Mobile-satellite (space-to-Earth) G104 G117		
7550-7750 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile			7550-7750 FIXED FIXED-SATELLITE (space-to-Earth) Mobile-satellite (space-to-Earth) G117		
7750-7850 FIXED METEORO LOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile			7750-7850 FIXED METEOROLOGICAL-SAT- ELLITE (space-to-Earth) 5.461B		
7850-7900 FIXED MOBILE except aeronautical mobile			7850-7900 FIXED		

7900.8025 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.461	7900-8025 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) Fixed G117	
8025-8175 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	8025-8175 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) Mobile-satellite (Earth-to-space) (no airborne transmissions) US258 G117	8025-8215
8175-8215 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	8175-8215 EARTH EXPLORATION-SATELLITE (space-to-Earth FIXED FIXED-SATELLITE (Earth-lo-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Mobile-satellite (Earth-to-space) (no airborne transmissions) US258 G104 G117	US258

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8500-8550 RADIOLOCATION 5.468 5.469			8500-8550 RADIOLOCATION G59	8500-8550 Radiolocation	
8550-8650 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.468 5.469 5.469A			8550-8650 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACERESEARCH (active)	8550-8650 Earth exploration-satellite (active) Radiolocation Space research (active)	
8650-8750 RADIOLOCATION 5.468 5.469			8650-9000 RADIOLOCATION G59	8650-9000 Radiolocation	
8750-8850 RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470					

8850-9000 RADIOLOCATION MARITIME RADIONAVIGATION 5.402 5.473	US53	US53	
9000-9200 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.471	9000-9200 AERONAUTICAL RADIO-NAVIGATION 5.337 Radiolocation G2 US48 G19	9000-9200 AERONAUTICAL RADIO-NAVIGATION 5.337 Radiolocation US48	Aviation (87)
9200-9300 RADIOLOCATION MARITIME RADIONAVIGATION 5.402 5.473 5.474	9200-9300 MARITIME RADIO-NAVIGATION 5.472 Radiolocation US110 G59 5.474	9200-9300 MARITIME RADIO-NAVIGATION 5.472 Radiolocation US110 5.474	
9300-9500 RADIONAVIGATION 5.476 Radiolocation 5.427 5.474 5.475	9300-9500 RADIONAVIGATION 5.476 US66 Radiolocation US51 G56 Meteorological aids 5.427 5.474 US67 US71	9300-9500 RADIONAVIGATION 5.476 US66 Radiolocation US51 Meteorological aids 5.427 5.474 US67 US71	
9500-9800 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION SPACE RESEARCH (active) 5.476A	9500-9800 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active)	9500-9800 Earth exploration-satellite (active) Radiolocation Space research (active)	
9800-10000 RADIOLOCATION Fixed 5.477 5.478 5.479	9800-10000 RADIOLOCATION 5.479	9800-10000 Radiolocation 5.479	

International Table			United States Table		FCC Rule Part(s)
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10.45-10.5 RADIOLOCATION Amateur Amateur-satellite 5.481			10.45-10.5 RADIOLOCATION US58 US108 G32	10.45-10.5 Radiolocation Amateur Amateur-satellite US58 US108 NG42 NG134	
10.5-10.55 FIXED MOBILE Radiolocation	110.5-10.55 FIXED MOBILE RADIOLOCATION		10.5-10.55 RADIOLOCATION US59		Private Land Mobile (SO)
10.55-10.6 FIXED MOBILE except aeronautical mobile Radiolocation			10.55-10.6	10.55-10.6 FIXED	Fixed Microwave (101)
10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation 5.149 5.482			10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) LIS265 US277	10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED SPACE RESEARCH (passive) US265 US277	
10.68-10.7 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.483			10.68-10.7 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) JS246 US355		

10.7-11.7 FIXED FIXED-SATELLITE(space-to-Earth) 5.441 5.484A (Earth-to-space) 5.484 MOBILE except aeronautical mobile	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 5.484A MOBILE except aeronautlcal mobile		10.7-11.7 us211	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 US211 NG104 JS355	Satellite Communications (25) Fixed Microwave (101)
11.7-12 5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE	11.7-12.1 FIXED 5.486 FIXED-SATELLITE (space-to-Earth) 5.484A Mobile except aeronautical mobile 5.485 5.488	11.7-12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE	11.7-12.1 5.486	11.7-12.2 FIXED-SATELLITE (space-to-Earth) NG143 NG145 Mobile except aeronautical mobile	
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5.487 5.487A 5.492	12.2-12.7 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE	12.2-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING 5.484A 5.487 5.491	12.2-12.7	12.2-12.7 FIXED BROADCASTING. SATELLITE	Satellite Communications (25) Fixed Microwave (101)
12.5-12.75 FIXED-SATELLITE (space-lo-Earth) 5.484A (Earth-to-space)	5.487A 5.488 5.490 5.492	12.5-12.75 FIXED FIXED-SATELLITE (space-lo-Earth) 5.484A MOBiLE except aeronautical mobile BROADCASTING-SATELLITE 5.493	//////// See next page for 12.7-12.75 GHz	5.487A 5.488 5.490	See next page lor 12.7-12.75 GHz
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FIXED-SATELLITE (Earth-to-space) 5.441 MOBILE Space research (deep space) (space-to-Earth)			12.75-13.25 US251	12.75-13.25 FIXED NG118 FIXED-SATELLITE (Earth-to-space) 5.441 NG104 MOBILE US251 NG53	
13.25-13.4 EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A 5.499			13.25-13.4 EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIO-NAVIGATION 5.497 SPACE RESEARCH (active) 5.498A	13.25-13.4 AERONAUTICAL RADIO-NAVIGATION 5.497 Earth exploration-satellite (active) Space research (active)	Aviation (87)
13.4-13.75 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A Standard freauency and time signal-satellite (Earth-to-space) 5.499 5.500 5.501 5.501B			13.4-13.75 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION G59 SPACE RESEARCH 5.501A Standard frequency and time signal-satellite (Earth-to-space) 5.501B	13.4-13.75 Earth exploration-satellite (active) Radiolocation Space research Standard lrequency and time signal-satellite (Earth-to-space)	Private Land Mobile (90)
13.75-14 FIXED-SATELLITE (Earth-to-space) 5.484A RADIOLOCATION Standard frequency and time signal-satellite (Earth-to-space) Space research 5.499 5.500 5.501 5.502 5.503 5.503A			13.75-14 RADIOLOCATION G59 Standard frequency and time signal-satellite (Earth-to-space) Space research US337 5.503A US356 US357	13.75-14 FIXED-SATELLITE (Earth-to-space) US337 Radiolocation Standard frequency and time signal-satellite (Earth-lo-space) Space research 5.503A US356 US357	Satellite Communications (25) 'rivate Land Mobile (90)

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14 25-14 3 I-SA' :arth-I 5 484A 5 506)NA\ 5.504 Mobile-satellite (Earth-to-space) except aeronautical mobile-satellite Space research *5.505 5.508* 5.509			14.2-14.4	14.2-14.4 FIXED-SATELLITE (Earth-to-space) Mobile-satellite (Earth-to-space) except aeronautical mobile-satellite Uobile except aeronautical mobile	Satellite Communications (25) Fixed Microwave (101)
14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A *5.506* MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) except aeronautical mobile-satellite Radionavigation-satellite	14.3-14.4 FIXED-SATELLITE (Earth-to-space) 5.484A 5.506 Mobile-satellite (Earth-to-space) except aeronautical mobile-satellite Radionavigation-satellite	14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A *5.506* MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) except aeronautical mobilesatellite Radionavigation-satellite			
14.4-14.47 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A *5.506* MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) except aeronautical mobile-satellite Space research (space-to-Earth)			14.4-14.47 Fixed Mobile	14.4-14.47 FIXED-SATELLITE (Earth-to-space) dobilesatellite (Earth-to-space) except aeronautical mobile-satellite	Satellite Communications (25)
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14.8-15.35 FIXED MOBILE Space research			14.7145-15.1365 MOBILE Fixed Space research US310	14.7145-15.1365 US310	
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15.35-15.4 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.511			15.35-15.4 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
15.4-15.43 AERONAUTICAL RADIONAVIGATION 5.511D			15.4-15.43 AERONAUTICAL RADIONAVIGATION US260 US211		Aviation (87)
15.43-15.63 FIXED SATELLITE (Earth-to-space) 5.511A AERONAUTICAL RADIONAVIGATION 5.511C			15.43-15.63 AERONAUTICAL RADIO-NAVIGATION US260 5.511C US211 US359	15.43-15.63 FIXED SATELLITE (Earth-to-space) AERONAUTICAL RADIO-NAVIGATION US260 5.511C US211 US359	Satellite Communications (25) Aviation (87)
15.63-15.7 AERONAUTICAL RADIONAVIGATION 5.511D			15.63-15.7 AERONAUTICAL RADIONAVIGATION US260 US211		Aviation (87)
15.7-16.6 RADIOLOCATION 5.512 5.513			15.7-16.6 RADIOLOCATION G59	15.7-17.2 Radiolocation	Private Land Mobile (90)

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17.1-17.2
RADIOLOCATION

5.512 5.513

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RADIOLOCATION
SPACE RESEARCH (active)

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Radiolocation

5.514

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FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516
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17.3-17.7
FIXED-SATELLITE (Earth-to-space) 5.516
BROADCASTING-SATELLITE
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17.7-17.8
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FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.516
BROADCASTING-SATELLITE
Mobile 5.518

5.515 5.517

17.8-18.1
FIXED
FIXED-SATELLITE (space-to-Ealth) 5.484A (Earth-to-space) 5.516
MOBILE

17.3-17.7
FIXED-SATELLITE (Earth-to-space) 5.516
Radiolocation

5.514

17.7-18.1
FIXED
FIXED-SATELLITE (space-to-Earth) 5.484A (Earth-to-space) 5.516
MOBILE

18.1-18.4
FIXED
FIXED-SATELLITE (space-to-Earth) 5.484A (Ealth-to-space) 5.520
MOBILE

5.519 5.521

.6-17.1
ADIOLOCATION G59
ace research (deep
ace) (Earth-to-space)

'.1-17.2
ADIOLOCATION G59

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ARTH EXPLORATION-
ATELLITE (active)
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7.7-17.8

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IXED-SATELLITE
(space-to-Earth) G117

5.519 US334

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17.2-17.3
Radiolocation
Earth exploration-satellite (active)
Space research (active)

17.3-17.7
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BROADCASTING-SATELLITE NG163 NG167

US259

17.7-17.8
FIXED
FIXED-SATELLITE (Earth-to-space) US271

NG144

17.8-18.3
FIXED

5.519 US334 NG144

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Satellite Communications (25)

Satellite Communications (25)

Auxiliary Broadcasting (74)
Cable TV Relay (78)
Fixed Microwave (101)

Auxilialy Broadcasting (74)
Cable TV Relay (78)
Fixed Microwave (101)

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18.4-18.6 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A MOBILE			us334	18.58-18.6 FIXED-SATELLITE (space-to-Earth) NG164 US334 NG144	Satellite Communications (25)
18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A 5.522C	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile SPACERESEARCH (passive) 5.222A	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A 5.522C	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US255 G117 SPACE RESEARCH (passive) US254 US334	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US255 NG164 SPACERESEARCH (passive) US254 US334 NG144	
18.8-19.3 FIXED FIXED-SATELLITE (space-to-Earth) 5.523A MOBILE			18.8-20.2 FIXED-SATELLITE (space-to-Earth) G117	18.8-19.3 FIXED-SATELLITE (space-to-Earth) NG165 US334 NG144	
19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) (Earth-space) 5.523B 5.523C 5.523D 5.523E MOBILE				19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) NG166 US334 NG144	Satellite Communications (25) Auxiliary Broadcast. (74) Cable TV Relay (78) Fixed Microwave (101)
19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A Mobile-satellite (space-to-Earth) 5.524	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528 5.529	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A Mobile-satellite (spaceto-Earth) 5.524		19.7-20.1 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.525 5.526 5.527 5.528 5.529 US334	Satellite Communications (25)

20.1-20.2 FIXED-SATELLITE (space-to-Earth) 5.484A MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528			us334	20.1-20.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.525 5.526 5.527 5.528 us334	
20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) 5.524			20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellife (space-to-Earth) G117	20.2-21.2 Standard frequency and time signal-satellite (space-to-Earth)	
21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)			21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US263		Fixed Microwave (101)
21.4-22 FIXED MOBILE BROADCASTING- SATELLITE 5.530	21.4-22 FIXED MOBILE	21.4-22 FIXED MOBILE BROADCASTING- SATELLITE 5.530 5.531	21.4-22 FIXED MOBILE		
22-22.21 FIXED MOBILE except aeronautical mobile 5.149			22-22.21 FIXED MOBILE except aeronautical mobile US342		
22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronaulical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) 5.149 5.532			22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) US342 US263		

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
22.5-22.55 FIXED MOBILE			22.5-22.55 FIXED MOBILE us211		Fixed Microwave (101)
22.55-23.55 FIXED INTER-SATELLITE MOBILE 5.149			22.55-23.55 FIXED INTER-SATELLITE US278 MOBILE US342		Satellite Communications (25) Fixed Microwave (101)
23.55-23.6 FIXED MOBILE			23.55-23.6 FIXED MOBILE		Fixed Microwave (101)
23.6-24 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340			23.6-24 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
24-24.05 AMATEUR AMATEUR-SATELLITE			24-24.05	24-24.05 AMATEUR AMATEUR-SATELLITE	ISM Equipment (18) Amateur (97)
24.05-24.25 RADIOLOCATION Amateur Earth exploration-satellite (active) 5.150			24.05-24.25 RADIOLOCATION G59 Earth exploration-satellite (active) 5.150	24.05-24.25 Radiolocation Amateur Earth exploration-satellite (active) 5.150	Private Land Mobile (90) Amateur (97)
24.25-24.45 FIXED	24.25-24.45 RADIONAVIGATION	24.25-24.45 RADIONAVIGATION FIXED MOBILE	24.25-24.45	24.25-24.45 FIXED	Fixed Microwave (101)

24.45-24.75 FIXED INTER-SATELLITE	24.45-24.65 INTER-SATELLITE RADIONAVIGATION 5.533 24.65-24.75 INTER-SATELLITE RADIOLOCATION-SAT- ELLITE (Earth-to-space)	24.45-24.65 FIXED INTER-SATELLITE MOBILE RADIONAVIGATION 5.533 24.65-24.75 FIXED INTER-SATELLITE MOBILE 5.533 5.534	24.45-24.65 INTER-SATELLITE RADIONAVIGATION 5.533 24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)		iatellite Communications (25)
24.75-25.25 FIXED	24.75-25.25 FIXED-SATELLITE (Earth-to-space) **5.535**	24.75-25.25 FIXED FIXED-SATELLITE (Earth-tospace) 5.535 MOBILE 5.534	24.75-25.05 RADIONAVIGATION	24.75-25.05 FIXED-SATELLITE (Earth-to-space) NG167 RADIONAVIGATION	Satellite Communications (25) Aviation (87)
			25.05-25.25	25.05-25.25 FIXED-SATELLITE (Earth-to-space) NG **167** FIXED	Satellite Communications (25) Fixed Microwave (101)
25.25-25.5 FIXED INTER-SATELLITE **5.536** MOBILE Standard frequency and time signal-satellite (Earth-to-space)			25.25-25.5 FIXED INTER-SATELLITE **5.536** MOBILE Standard frequency and time signal-satellite (Earth-to-space)	25.25-25.5 Standard frequency and time signal-satellite (Earth-to-space)	
25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) 5.536A 5.536B FIXED INTER-SATELLITE 5.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space)			25.5-27 EARTH EXPLORATION- SATELLITE (space-to- Earth) 5.536A FIXED INTER-SATELLITE 5.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space)	25.5-27 Earth exploration-satellite (space-to-Earth) **5.536A** Standard frequency and time signal-satellite (Earth-to-space)	
27-27.5 FIXED INTER-SATELLITE **5.536** MOBILE	27-27.5 FIXED FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE 5.536 **5.537** MOBILE		27-27.5 FIXED INTER-SATELLITE **5.536** MOBILE	27-27.5	

International Table			United Stales Table		FCC Rule Part(s)
Region I	Region 2	Region 3	ederal Government	Non-Federal Government	
27.5-28.5 FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.539 MOBILE 5.538 5.540			7.5-30	27.5-29.5 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	Satellite Communications (25) Fixed Microwave (101)
28.5-29.1 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.523A 5.539 MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540					
29.1-29.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.523C 5.523E 5.535A 5.539 5.541A MOBILE Earth exploration-satellite (Earth-to-space) 5.541					
29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.525 5.526 5.527 5.529 5.540 5.542	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobilesatellite (Earth-to-space) 5.540 5.542		29.5-29.9 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) 5.525 5.526 5.527 5.529	iatellite Communications (25)
MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5 543 5.525 5.526 5.527 5.538 5.540 5.542				29.9-30 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) 5.525 5.526 5.527 5 543	

30-31 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-lo-Earth) 5.542			30-31 FIXED-SATELLITE (Earth-to-space) MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth) G117	30-31 Standard frequency and time signal-satellite (space-to-Earth)	
31-31 3 FIXED 5.543A MOBILE Standard frequency and lime signal-satellite (space-to-Earth) Space research **5.544 5.545** **5.149**			31-31.3 Standard frequency and time signal-satellite (space-to-Earth) **US211 US342**	**31-31.3** FIXED MOBILE Standard frequency and time signal-satellite (space-to-Earth) **US211 US342**	Fixed Microwave **(101)**
EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) **5.340**			EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive)		
31.5-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile **5.149 5.546**	**31.5-31.8** EARTH EXPLORATION. SATELLITE (passive) RADIO ASTRONOMY SPACERESEARCH (passive) **5.340**	31.5-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACERESEARCH (passive) Fixed Mobile except aeronautical mobile **5.149**	**US246**		
31.8-32 FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) **5.547 5.547B 5.540**			**31.8-32** RADIONAVIGATION **US69** SPACERESEARCH (deep space) (space-to-Earth) **US262** **5.548 us211 uszzz**	**31.8-32** SPACE RESEARCH (deep space) (space-to-Earth) **US262** **5.548 us211 uszzz**	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
32-32.3 FIXED 5.547A INTER-SATELLITE RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earlh) 5.547 5.547C 5.540			32-32.3 RADIONAVIGATION US69 SPACERESEARCH (deep space) (space-to-Earlh) US262 uszzz	32-32.3 SPACE RESEARCH (deep space) (space-to-Earlh) US262 uszzz	
32.3-33 FIXED 5.547A INTER-SATELLITE RADIONAVIGATION 5.547 5.547D 5.548			32.3-33 INTER-SATELLITE US278 RADIONAVIGATION US69 uszzz		Aviation (87)
33-33.4 FIXED 5.547A RADIONAVIGATION 5.547 5.547E			33-33.4 RADIONAVIGATION US69 US360 G117		
33.4-34.2 RADIOLOCATION 5.549			33.4-34.2 RADIOLOCATION US360 G117	33.4-35.5 Radiolocation US360	Private Land Mobile (90)
34.2-34.7 RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space) 5.549			34.2-34.7 RADIOLOCATION SPACE RESEARCH (deep space) (Earth-lo-space) US262 US360 G34 G117	34.2-34.7 Radiolocation Space research (deep space) (Earth-to-space) US262 US360	
34.7-35.2 RADIOLOCATION Space research *5.550* 5.549			34.7-35.5 RADIOLOCATION	34.7-35.5 Radiolocation	
35.2-35.5 METEOROLOGICAL AIDS RADIOLOCATION 5.549			US360 G117	US360	
35.5-36 METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.549 5.551A			35.5-36 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) US360 G117	35.5-36 Earth exploration-satellite (active) Radiolocation Space research (active) US360	

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UNITED STATES (US) FOOTNOTES

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US7 In the band 420-450 MHz and within the following areas, the peak envelope power output of a transmitter employed in the amateur service shall not exceed 50 watts, unless expressly authorized by the Commission after mutual agreement, on a case-by-case basis, between the Federal Communications Commission Engineer in Charge at the applicable district office and the military area frequency coordinator at the applicable military base. For areas (e) through (j), the appropriate military coordinator is located at Peterson AFB, CO.

(a) The entire State of New Mexico and Texas west of longitude 104° 00' West;

(b) The entire State of Florida including the Key West area and the areas enclosed within a 322-kilometer (200-mile) radius of Patrick Air Force Base, Florida (latitude 28° 21' North, longitude 80° 43' West), and within a 322-kilometer (200-mile) radius of Eglin Air Force Base, Florida (latitude 30° 30 North, longitude 86° 30' West);

(c) The entire State of Arizona;

(d) Those portions of California and Nevada south of latitude 37° 10' North, and the areas enclosed within a 322-kilometer (200-mile) radius of the Pacific Missile Test Center, Point Mugu, California (latitude 34" 09' North, longitude 119" 11' West).

(e) In the State of Massachusetts within a 160-kilometer (100-mile) radius around locations at Otis Air Force Base, Massachusetts (latitude 41° 45' North, longitude 70° 32' West).

(f) In the State **of** California within a 240-kilometer (150-mile) radius around locations at Beale Air Force Base, California (latitude 39° 08' North, longitude 121° 26' West).

(g) In the State of Alaska within a 160-kilometer (100-mile) radius of Clear, Alaska (latitude 64° 17' North, longitude 149° 1 0 West).

(h) In the State of North Dakota within a 160-kilometer (100-mile) radius of Concrete, North Dakota (latitude 48° 43' North, longitude 97° 54' West).

(i) In the States of Alabama, Georgia and **South** Carolina within **a** 200-kilometer (124-mile) radius of Warner Robins Air Force Base, Georgia (latitude 32" 3 8 North, longitude 83° 35' West).

(j) In the State of Texas within a 200-kilometer (124-mile) radius of Goodfellow Air Force Base, Texas (latitude **31**" 25' North, longitude 100° 24' West).

* * * * *

US48 In the band 9000-9200 MHz, the use of the radiolocation service by non-Federal Government licensees may be authorized on the condition that harmful interference is not caused to the aeronautical radionavigation service or to the Federal Government radiolocation service.

* * * * *

US110 In the band 9200-9300 MHz, the use of the radiolocation service by non-Federal Government licensees may be authorized on the condition that harmful interference is not caused to the maritime radionavigation service or to the Federal Government radiolocation service.

* * * * *

US217 In the band 420-450 MHz, pulse-ranging radiolocation systems may be authorized for Federal and non-Federal Govemment use along the shorelines of the contiguous 48 States and Alaska. In the sub-band 420-435 MHz, spread spectrum radiolocation systems may be authorized **for** Federal and non-Federal Government use within the contiguous 48 States and Alaska. All stations operating in accordance with this provision shall be secondary to stations operating in accordance with the Table **of**

Frequency Allocations. Authorizations shall be granted on a case-by-case basis: however, operations proposed to be located within the following geographic areas should not expect to be accommodated:

(a) The entire State of New Mexico and Texas west of longitude 104° 00 West:

(b) The entire State of Florida including the Key West area and the areas enclosed within a 322-kilometer (200-mile) radius of Patrick Air Force Base, Florida (latitude 28° 21' North, longitude 80° 43' West), and within a 322-kilometer (200-mile) radius of Eglin Air Force Base, Florida (latitude 30" 3 0 North, longitude 86° 30' West):

(c) The entire State **of** Arizona;

(d) Those portions of California and Nevada south of latitude 37" 10' North, and the areas enclosed within a 322-kilometer (200-mile) radius of the Pacific Missile Test Center, Point Mugu, California (latitude 34° 09' North, longitude 119" 11' West).

(e) In the State of Massachusetts within **a** 160-kilometer (100-mile) radius around locations at Otis Air Force Base, Massachusetts (latitude 41° 45' North, longitude 70° 32' West).

(f) In the State of California within a 240-kilometer (150-mile) radius around locations at Beale Air Force Base, California (latitude 39° 08' North, longitude 121° 26' West).

(g) In the State of Alaska within a 160-kilometer (100-mile) radius of Clear, Alaska (latitude 64° 17' North, longitude 149" 1 0 West).

(h) In the State of North Dakota within a 160-kilometer (100-mile) radius of Concrete, North Dakota (latitude 48° 43' North, longitude 97° 54' West).

(i) In the States of Alabama, Georgia and South Carolina within a 200-kilometer (124-mile) radius of Warner Robins Air Force Base, Georgia (latitude 32° 38' North, longitude 83" 35' West).

(j) In the State of Texas within a 200-kilometer (124-mile) radius of Goodfellow Air Force Base, Texas (latitude 31° 25' North, longitude 100" 24' West).

All stations operating in accordance with this provision will be secondary to stations operating in accordance with the Table of Frequency Allocations.

* * * * *

US244 The band 136-137 MHz is allocated to the non-Federal Government aeronautical mobile (R) service on a primary basis, and is subject to pertinent international treaties and agreements. The frequencies 136, 136.025, 136.05, 136.075, 136.1, 136.125, 136.15, 136.175, 136.2, 136.225, 136.25, 136.275, 136.3, 136.325, 136.35, 136.375, 136.4, 136.425, 136.45, and 136.475 MHz are available **on** a shared basis to the Federal Aviation Administration for air traffic control purposes, such as automatic weather observation stations (AWOS), automatic terminal information services (ATIS), flight information services-broadcast (FIS-B), and airport control tower communications.

* * * * *

US246 No station shall be authorized to transmit in the following bands:
73-74.6 MHz,
608-614 MHz, except for medical telemetry equipment',
1400-1427 MHz,
1660.5-1668.4 MHz,
2690-2700 MHz,
4990-5000 MHz,
10.68-10.7 GHz,

[1] Medical telemetry equipment shall not cause harmful interference to radio astronomy operations in the band 608-614 MHz and shall be coordinated under the requirements found in 47 **C.F.R.** $95.1 119.

15.35-15.4 GHz,
23.6-24 GHz,
31.3-31.8 GHz,
50.2-50.4 GHz,
52.6-54.25 GHz,
86-92 GHz,
100-102 GHz,
105-116 GHz,
164-168 GHz,
182-185 GHz,
217-231 GHz.

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US262 The use of the band 31.8-32.3 GHz by the space research service (deep space) (space-to-Earth) and of the band 34.2-34.7 GHz by the space research service (deep space) (Earth-to-space) are limited to Goldstone, California.

* * * * *

US276 Except as otherwise provided for herein, use of the band 2360-2385 MHz by the mobile service **is** limited to aeronautical telemetering and associated telecommand operations for flight testing of manned or unmanned aircraft, missiles or major components thereof. The following three frequencies are shared on a co-equal basis by Government and non-Government stations for telemetering and associated telecommand operations of expendable and reusable launch vehicles whether or not such operations involve flight testing: 2364.5 MHz, 2370.5 MHz, and 2382.5 MHz. All other mobile telemetering uses shall be secondary to the above uses.

US277 The band 10.6-10.68 GHz is also allocated on a primary basis to the radio astronomy service. However, the radio astronomy service shall not receive protection from stations in the fixed service which are licensed to operate in the one hundred most populous urbanized areas as defined by the 1990 **U.S.** Census.

US278 In the bands 22.55-23.55 GHz and 32.3-33 GHz, non-geostationary inter-satellite links may operate on a secondary basis to geostationary inter-satellite links.

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US310 In the band 14.896-15.121 GHz, non-Federal Government space stations in the space research service may be authorized on a secondary basis to transmit to Tracking and Data Relay Satellites subject to such conditions as may be applied on a case-by-case basis. Such transmissions shall not cause harmful interference to authorized Federal Government stations. The power flux-density produced by such non-Federal Government stations at the Earths surface in any **4** kHz band for all conditions and methods of modulation shall not exceed:

-148 dB(W/m^2) for $0° < \delta \leq 5°$
$-148 + (\delta - 5)/2$ dB(W/m^2) for $5° < \delta \leq 25°$
-138 dB(W/m^2) for $25° < \delta \leq 90°$

where δ is the angle **of** arrival of the radio-frequency wave (degrees above the horizontal). These limits relate to the power-flux-density and angles of arrival which would be obtained ,under free-space propagation conditions.

* * * * *

US316 The band 2900-3000 MHz is also allocated on a primary basis to the meteorological aids service. Operations in this service are limited to Federal Government Next Generation Weather **Radar** (NEXRAD) systems where accommodation in the 2700-2900 MHz band is not technically practical and are subject to coordination with existing authorized stations.

* * * * *

US320 The use of the bands 137-138 MHz, 148-150.05 MHz, and 400.15-401 MHz by the mobile-satellite service is limited to non-voice, non-geostationary satellite systems and may include satellite links between land earth stations at fixed locations.

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US328 The band 2320-2345 MHz is also available **for** aeronautical telemetering and associated telecommand operations for flight testing of manned or unmanned aircraft, missiles or major components thereof on a secondary basis to the Satellite Digital Audio Radio Service.

* * * * *

US342 In making assignments to stations of other services to which the bands:

13360-13410kHz,	14.47-14.5GHz,	145.45-145.75 GHz,
37.5-38.25 MHz,	22.01-22.21 GHz,	146.82-147.12GHz,
322-328.6 MHz,	22.21-22.5 GHz,	150-151 GHz,
1330-1400MHz,	22.81-22.86 GHz,	174.42-175.02GHz,
1610.6-1613.8 MHz,	23.07-23.12 GHz,	177-177.4 GHz,
1660-1660.5MHz,	31.2-31.3 GHz,	178.2-178.6 GHz,
1668.4-1670 MHz,	36.43-36.5 GHz,	181-181.46GHz,
3260-3267 MHz,	42.5-43.5 GHz,	186.2-186.6 GHz,
3332-3339 MHz,	48.94-49.04 GHz,	250-251 GHz,
3345.8-3352.5 MHz,	93.07-93.27 GHz,	257.5-258 GHz,
4825-4835 MHz,	97.88-98.08 GHz,	261-265 GHz,
4950-4990 MHz,	140.69-140.98GHz,	262.24-262.76 GHz,
6650-6675.2 MHz,	144.68-144.98GHz,	265-275 GHz

are allocated, all practicable steps shall be taken to protect the radio astronomy service from harmful interference. Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. 4.5 and 4.6 and Article 29 of the ITU Radio Regulations).

* * * * *

USxxx In the band 401-403 MHz, the non-Federal Government Earth exploration-satellite (Earth-to-space) and meteorological-satellite (Earth-to-space) services are limited to earth stations transmitting to Federal Government space stations.

USyyy The band 1164-1189 MHz is also allocated to the radionavigation-satellite service (space-to-Earth, space-to-space) on a primary basis. In this band, stations in the radionavigation-satellite service shall not cause harmful interference to, nor claim protection from, stations of the aeronautical radionavigation service.

USzzz In designing systems for the inter-satellice service in the band 32.3-33 GHz, for the radionavigation service in the band 32-33 GHz, and for the space research service (deep space) (space-to-Earth) in the band 31.8-32.3 GHz, all necessary measures shall be taken to prevent harmful interference between these services, bearing in mind the safety aspects of the radionavigation service.

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NON-FEDERAL. GOVERNMENT (NG) FOOTNOTES

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NG41 Frequencies in the bands 37004200 MHz and 5925-6425 MHz, may also be assigned to stations in the international fixed public and international control services located in Puerto Rico, the U.S. Virgin Islands, and Navassa Island.

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FEDERAL GOVERNMENT (G) FOOTNOTES

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G2 In the bands 216-225, 420450 (except as provided by US217 and G129) 890-902, 928-942, 1300-1400, 2310-2385, 2417-2450, 2700-2900, 5650-5925 and 9000-9200 MHz, the Government radiolocation service is limited to the military services.

* * * * *

G129 Government wind profilers are authorized to operate on a primary basis in the radiolocation service in the frequency band 448-450 MHz with an authorized bandwidth of no more than 2 MHz centered on 449 MHz, subject to the following conditions: 1) wind profiler locations must be pre-coordinated with the military services to protect fixed military radars: and 2) wind profiler operations shall not cause harmful interference to, nor claim protection from, military mobile radiolocation stations that are engaged in critical national defense operations.

PART 25--SATELLITE COMMUNICATIONS

4. The authority citation for Part 25 continues to read as follows:

AUTHORITY: 47 U.S.C. 701-744. Interprets or applies Sections 4, 301,302,303, 307,309 and 332 of the Communications Act, as amended, 47 U.S.C. Sections 154, 301, 302, 303, 307, 309 and 332, unless otherwise noted.

5. Section 25.202(a)(3) is revised and new sections 25.202(a)(4)(iii) and 25.202(a)(7) are added to read as follows:

§ 25.202 Frequencies, frequency tolerance and emission limitations.

(a)(1) * * *

* * * * *

(3) The following frequencies are available for use by the non-voice, non-geostationary mobile-satellite service:

137-138 MHz: space-to-Earth
148-150.05 MHz: Earth-to-space

399.9-400.05 MHz: Earth-to-space
400.15-401 MHz: space-to-Earth

(4) * * *

(iii) The following frequencies are available for use by the L-band Mobile-Satellite Service:

1525-1559 MHz: space-to-Earth
1626.5-1660.5 MHz: Earth-to-space

The use of the frequencies 1544-1545 MHz and 1645.5-1646.5 MHz is limited to distress and safety communications.

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Part 87—AVIATION SERVICES

6. The authority citation for Part 87 continues to read as follows:

AUTHORITY: 48 Stat. 1066, 1082, as amended, 47 U.S.C. 154, 303, 307(e) unless otherwise noted. Interpret or apply 48 Stat. 1064-1068, 1081-1105, as amended; 47 U.S.C. 151-156, 301-609.

7. Section 87.303 is amended by revising paragraph (d)(1) to read as follows:

§ 87.303 Frequencies.

* * * * *

(d)(1) Frequencies in the bands 1435-1525 MHz and 2360-2385 MHz are assigned primarily for telemetry and telecommand operations associated with the flight testing of manned or unmanned aircraft and missiles, or their major components. The bands 1525-1535 MHz and 2310-2360 MHz are also available for these purposes on a secondary basis. Until January 1,2007, flight test operations in the band 2385-2390 MHz may continue on a primary basis within 160 km of the nine sites listed in 47 C.F.R. § 2.106, footnote US363. Permissible uses of these bands include telemetry and telecommand transmissions associated with the launching and reentry into the Earth's atmosphere, as well as any incidental orbiting prior to reentry, of manned or unmanned objects undergoing flight tests. In the band 1435-1530 MHz, the following frequencies are shared with flight telemetry mobile stations: 1444.5, 1453.5, 1501.5, 1515.5, 1524.5, and 1525.5 MHz. In the band 2360-2390 MHz, the following frequencies may be assigned on a co-equal basis for telemetry and associated telecommand operations in fully operational or expendable and re-usable launch vehicles, whether or not such operations involve flight testing: 2364.5, 2370.5 and 2382.5 MHz. In the band 2360-2390 MHz, all other mobile telemetry uses are secondary to the above stated launch vehicle uses.

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